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Briefing

Jobs threat at Data 100

THE wave of redundancies now looks like sweeping over Hemel Hempstead-based Data 100, the firm best known as a supplier of IBM-compatible remote batch terminals. Its US parent has announced that 300 employees will be made redundant in its operations outside the US as part of a major shake-up involving a \$125 million write-off (see Company News, Page 10).

Software show

LONDON is to get another software show, to be held at the Wembley Conference Centre from December 1 to 3. The International Packaged Software Conference and Exhibition will be run by the Illinois-based Hitchcock Publishing Company. The company is entering a hotly contested race to provide a software market in Europe, and the new show rivals CO's Soft '81, planned for September 2-4.

Big bubbles

SHIPMENTS of bubble memory devices will increase from \$18.4 billion in 1980 to \$226 million in 1985, an average annual growth rate of 68 per cent, according to a report from the Venture Development Corporation of Massachusetts.

E4m order

THE Solartron Industrial Systems Group, part of Solartron Schlumberger, has won an order worth £4 million from the Central Electricity Generating Board. It will supply systems to monitor generators and transmission equipment at the new Drax power station at Easingwold in Yorkshire.

Gas by VDU

A VDU order which is expected to grow to a total of 600 units, worth over £1 million, has been placed with Videcom by East Midlands Gas. The initial order, valued at £20,000, is for eight screens and associated communications equipment. The Videcom will integrate terminals into EMGAS's existing Univac 1100 based network.

Cut-price

A BOOST for Birmingham retailers has come from IBM which has cut the price of the company's now 3033N-based system from £1.9 million to £1.65 million, a saving of £250,000.

Unix-variant?

IBM commercial applications in the Unix operating system are being used by Kean Computers, a Kent-based company, to design and manufacture its own Unix-variant. The Unix-variant is being designed by the company in Northampton. The Unix-variant is being designed by the company in Northampton. The Unix-variant is being designed by the company in Northampton.

FIRST BRIEFCASE UNIT WITH FULL KEYBOARD SPEARS MARKET ENTRY



Sony's portable word processor, the Typecorder, records text on microcassettes for printing out an airtight at the user's office. Each cassette can hold 120 pages of text.

Sony shakes up WP world

JAPANESE consumer electronics giant Sony has made its eagerly-awaited entry into the word processor business with a revolutionary portable keyboard and a series of desk machines aimed at the higher end of the market.

A wide range of accessories is to be offered including a device for driving an electric typewriter and an acoustic coupler.

The portable Typecorder unit includes a full QWERTY keyboard, a single-line liquid crystal display, 2Kbytes of memory and a micro-cassette drive.

Weighing three pounds, about the size of a clipboard and 1 1/2 inches thick, the Typecorder is the first realisation of the idea of a portable word processor that has been discussed in research labs for years.

It competes with the British Microwriter, which is smaller but has a non-standard chord keyboard.

New model

The Typecorder is aimed at executives and surveyors, for example, who would like to compose documents while travelling in trains or planes. The unit costs

\$1,400 and needs another device for printing out the documents.

For this, Sony offers an interface to any standard communicating printer; alternatively, a new model of portable needle printer is offered, weighing nine pounds and costing \$800. This has a resolution of around 20 by 30 dots per character.

The Typecorder can also be attached for output to an actuator, which sits on top of an IBM golf-ball typewriter, presses down the keys with solenoids and costs about \$600.

Typecoders can act additionally as dictating machines, recording the sound on the same cassette drive as that used for text.

Full-page screen

Sony designated its range of ordinary word processors the Series 35. This starts at \$9,000 with a single-line display, twin micro-floppy discs and daisy-wheel or equivalent printer and at the top of the range has a full-page black-on-white screen at a total cost of about \$13,500.

The micro-floppy discs are Sony's own development, 3 1/2 inches in diameter and holding 437,500 bytes each. It is planned to sell these drives OEM as well as in Sony products.

The products are due for a US launch in June but plans for Europe are not yet settled. All the equipment will be made by Sony in Japan except for the standard printers, which will probably come from NEC, Qume or Diablo.

White-on-black screens have very high resolution, showing quality type fonts with lines justified on the screen. The image can be split, showing two documents side by side and reduced in size. This makes it especially easy to transfer text from one document to

● Turn to page 20

Reshuffle boost for DP industry

THE computer industry's influence in government has been given a major boost by the appointment of Kenneth Baker, MP, for St Marylebone as a Minister in the Department of Industry.

Doug Eysenck, of the Computing Services Association, described himself as "delighted" at the announcement, since Baker had long taken an interest in the industry and has been a director of Geac Computer Services, and a consultant to Logica.

Baker is expected to take over responsibility for Information Technology from Adam Butler, who is moving to the Northern Ireland Office.

Paul Channon, who had responsibility in the Civil Service Department for the Central Computers and Telecommunications Agency, is being replaced by Barney Hayhoe, from the MoD.

W. Germany sets the pace

WEST GERMANY is expected to have the highest rate of growth in its electronics industry in 1981, according to West European Consultants.

The UK is expected to come second with a growth increase of nearly 13% in 1981 to approach \$20 billion in sales. In France, growth should increase at 12% while sales will exceed \$20 billion.

The new Mackintosh Yearbook forecasts that electronics in Western Europe will become a

\$100 billion a year industry in 1981. But the combined Gross Domestic Product is expected to increase by only one per cent.

According to Mackintosh, sales in electronics will rise from \$92 billion to \$103 billion in 1981 and continue to rise at between 11 and 12% until 1984. The UK's share of the European market has risen from 16% in 1978 to 19% in 1980.

The main area of growth up to 1984 will be in the electronic data processing sector which is predicted to increase in market value from \$16 billion in 1979 to \$42 billion in 1984 for Europe as a

whole at an average annual growth rate of 23%.

The European office equipment market is expected to double from the 1979 figure to reach more than \$6.5 billion by 1984. Photocopying equipment will increase threefold between 1979 and 1984.

Mackintosh forecasts the consumer market as a continuing problem area with an almost static market between 1981 and 1984 at around \$15 billion a year. For example, the novelty of video games, which will have sold around 4.2 million units in 1980, will wear off by 1984.

MBE for Quest Automation director

ERIK WARD-ZINSKI, sales and marketing executive of Quest Automation Systems, was one of several people from the computer and computer-related industries in the New Year honours list.

Polish-born Ward-Zinski was awarded the MBE for services to export. He has been with Quest since 1972, currently serving as director of East European sales. The company is one of the UK's largest exporters to the USSR and East Europe thanks to the success of its GAD/CAM computer aided design and manufacturing kit.

George Jefferson, chairman-designate of British Telecom, became Knight Bachelor for his services to export as chairman and chief executive of the dynamics group at British Aerospace.

Electronic Components for charitable work with educationally subnormal children; and Christopher Metcalfe, who retired at the end of last year as director of the Telecommunications Engineering

and Manufacturing Association, for services to export.

The British Empire Medal was given to James Broughton of Marconi Space and Defence for services to export.

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Downtime

by Chad

Roman holiday

THE Italians aren't quite as hopeless technically as they are made out to be, I am assured by Barry Mahon, of the EuroNet staff in Luxembourg. The Rome node of EuroNet was out of action for an entire Monday recently, and rumours had been circulating among users that it had been shut down because it was a

national holiday.

In fact, says Mahon, there had been a power failure following tests that had been carried out on the Sunday, and they could not get the repairs done because of the holiday.

Of course, from the poor user's point of view, it's the same difference.



"X is an unknown quantity, equal to the number of years it takes to get your phone installed".

Sort out the protesters — by putting them online

A BOMB attack in London the other day was attributed, if I heard right, to "The Armenians".

My bafflement over these myriad organisations all protesting about one thing or another grew even more intense, and led me to wonder whether an online database of terrorist groups would help a bewildered public sort it all out.

On looking into this, I discovered that someone else was way ahead of me, and once again British enterprise has leapt to the fore. I visited the entrepreneur, Major E. S. Kerboom, at his headquarters, an abandoned concrete pillbox just off the M1. Here he runs Sky-High Ltd and its online service, giving equities facts on group aims and objectives, their records of achievements, a league table of efficiency such as numbers of "own goals," and where to send donations.

"We provide a service, not just to the public, but to the terror...err, progressive groups themselves," Major Kerboom told me. "For example, names with dots in them are very popular, but there are only 365 dots in the year so there's a

danger of embarrassing overlap. We keep a file of which data are taken and which are free, but I'm afraid there aren't many left now. It won't be long before we hear of the Patagonian 93rd of October Group."

"We also help groups with their advance planning. How disappointing it is to bring off a nice big BLAAMM only to have the headlines grabbed by another explosion at the same time. We let groups book slots in advance, but naturally we charge more for popular times such as 'holidays' or when there isn't much other interesting news, such as during Party conferences. What really worries me is a client losing its coverage through competition with good news, such as Prince Charles finally popping the question. I'm trying to get the Prince to register with us as well to avoid this danger."

Chewing on his plump Havans, made from tobacco personally picked by Dr Castro, Major Kerboom continued, "We also provide an arbitration service between groups claiming responsibility for the same bang. Of course we respect scrupulously the privacy of our customers," the major asserted, adding

proudly, "We're the first people fully to implement the Lindop Committee's proposals on Data Protection. This was tricky though, because strangely enough the Committee said nothing about a code of practice for terrorist online systems."

To encourage business, Sky-High Ltd is offering a prize to the organisation causing the most havoc to London rush-hour traffic combined with the most obscure aims. I've heard a tip that the Norwegian Antarctic Territory Peoguin Liberation Front has a commanding lead in this race.

Clouds

Any clouds on the horizon? Major Kerboom scowled. "What really worries me is overseas competition. My rivals in Algeria, Libya and North Korea are heavily subsidised by their governments. How can I be expected to make a profit with the pound as high as it is?"

His voice quivering, the major went on, "Our government is supposed to be in favour of enterprise, yet they won't give me a rotten million or two for my development programme. I'm even prepared to buy an ICL computer."

NEWS IN BRIEF

Introducing FINAPL

A FINANCIAL modelling system developed by Manchester-based software specialists Fars Computer Services will be made available to the APL*PLUS time sharing service run by STSC (formerly Scientific Time-Sharing Corp) in America.

Called FINAPL, and written in APL, it aims to provide accountants with budget, financial strategy and investment appraisal tools and joins the existing PL large-scale financial planning system.

FINAPL runs on STSC Amdahl 470/V6 and IBM 370/V6 linked via Tymnet and prime line to its 18 US and 16 European offices. APL*PLUS is marketed in the UK by APL*PLUS Ltd in London.

Analysis pack

A CRITICAL path analysis package which will run on any micro system supporting UCSD Pascal such as the Apple II has been announced by IBC Computers. Systems of Manchesterfield. A typical network of 1,000 activities will take 12 minutes to analyse. About 37,000 activities are available in the system. Cost, including a 5.25" floppy disc unit, VDU, printer and CPA software, is about £5,500.

Recognised

CANADA'S geometric method of transmitting graphics to video terminals has received recognition from CCITT, the international telecommunications committee, following the Canadian Communications Ministry's howls at how overshadowed by the British CCITT systems at the last meeting of CCITT in June (CW, July 1980).

Distributor

VIEWDATA Business Systems of Camberley, Surrey, the new distributor of Annafone (CW, Dec 21), is to distribute ITT's visual products, starting with an £80 colour terminal with a 16-in screen and a choice of numeric alphanumeric or editing keyboards. The terminals can also be rented for £85 a quarter.

400 for 20 places

COMPUTER fever struck UK land school-leavers when over 400 of them applied for 20 places at government-sponsored course at Birmingham's Bourneville College of Further Education. The course starts this month and another planned for April. The students will get £26 per week grant.

BCS dates

OPEN systems interconnection will be the subject of the British Computer Society Data Communication specialist group's first meeting of the year on January 22 at BCS headquarters, Clive Wood.

The European Computer Manufacturers' Association Protocol Committee is to talk about developments within the International Standards Organisation seven-layer model. Subsequent meetings are planned for March and May 19 on System X and cryptography respectively.

TEN YEARS AGO

From Computer Weekly of January 7, 1971.

AFTER only nine months' operation Computicket, the International Publishing Corporation's computerised theatre ticket booking subsidiary, is to be closed, having lost nearly £2,000,000. Almost half its staff, from divisional management downwards, has been made redundant by Computer Enterprises Ltd, the Ealing-based consultancy and software house. Mr Murray Laver, the

Post Office board member for data processing, was made a CBE in the New Year Honours List. A new and powerful contender in European markets for communications equipment, computer peripherals and computer services, is likely to emerge as a result of plans currently being implemented in the UK by General Telephone and Electric Corp, one of America's top 20 corporations.

B4, 61A moves to F3, T15

WE'VE MOVED

COMPUTER WEEKLY moves on 18 November 1980 to Quadrant House, The Square, London EC4A 3DF. Tel 01-475 0000.

FOCUS

Time to come to the aid of the first-time user

THERE is no better time to be a first-time user of micro training. With high street stores jumping about the micro bandwagon, it is essential that the computer industry comes to the aid of the user and prospective user party.

Unfortunately, it seems the industry has not yet got the message. Such DP establishment worry beads as are in evidence concern the training and provision of installation personnel.

Shoulders, whether cold or otherwise, are turned away from the plight of the first-time micro user.

The NCC is setting the industry an example by erecting a new London Training Centre for basic Computer courses in January. The NCC, in association with NEDO, has identified a national shortage of 16,000 programmers and analysts.

Certificate

This shortage is expanding at a high rate with over 500 extra programmers a month required over the next five years or so.

To deal with this situation, the NCC has devised a one-week basic course for trainees without previous computer experience. The course is designed to give students a view to taking the City and Guilds basic certificate in computing when they have completed the course.

Even allowing for the fact that the NCC course employs colour

video training and microcomputer aids, the modest one-week period does appear rather suspect.

The organisers have no such reservations and the course will provide experience of designing, developing, testing, debugging and maintaining Cobol programs besides basic hands-on experience.

If this is the case, there is a strong probability that every DPM in the land will enrol his entire installation team, plus himself.

Target area

Whether the State-supported NCC has got the right target area is debatable. There are already many training and teaching courses available to the professional programmer — most DPMs could produce a folder full of names, addresses and fees.

Where practical training, with or without hands-on procedures, would prove beneficial is in the fast-expanding area of microprocessor users. It is the current and potential micro user who is in most need of industry care, add attention.

All too often, the micro purchaser discovers only after the new product has been unwrapped that, far from being a boon and delight to his organisation, the equipment presages a long and despairing

struggle. Limitations include lack of flexibility, enhancement and all too often, irreparability. Selling a personal computer system to the home hobbyist or professional DP man is a good and honourable

Selling the same system to a non-DP specialist businessman should be a matter for industry concern, particularly if the user discovers too late that an associated VDU or TV screen is an essential extra.

Expensive

It is becoming commonplace for DP specialists to be asked to provide help and guidance covering such basic micro matters as software, coding and processing time-scales. Even matters like data stationery and media input appear to cause strain and grief.

Perhaps the industry would be better occupied protecting the micro user from abuse, micro equipment from misuse and preventing the supplier from being able to take users for expensive rides.

If the NCC cannot devise practical courses on the need of the micro user, maybe it could set up a National Micro Users Forum as a useful corrective.

Only a strong and respected organisation such as the BCS or NCC could bring pressure to bear on the micro industry.

This pressure should include the requirement for all micro equipment to carry an industry health warning label along the lines that "This equipment may cause health and that of your company if not handled correctly."

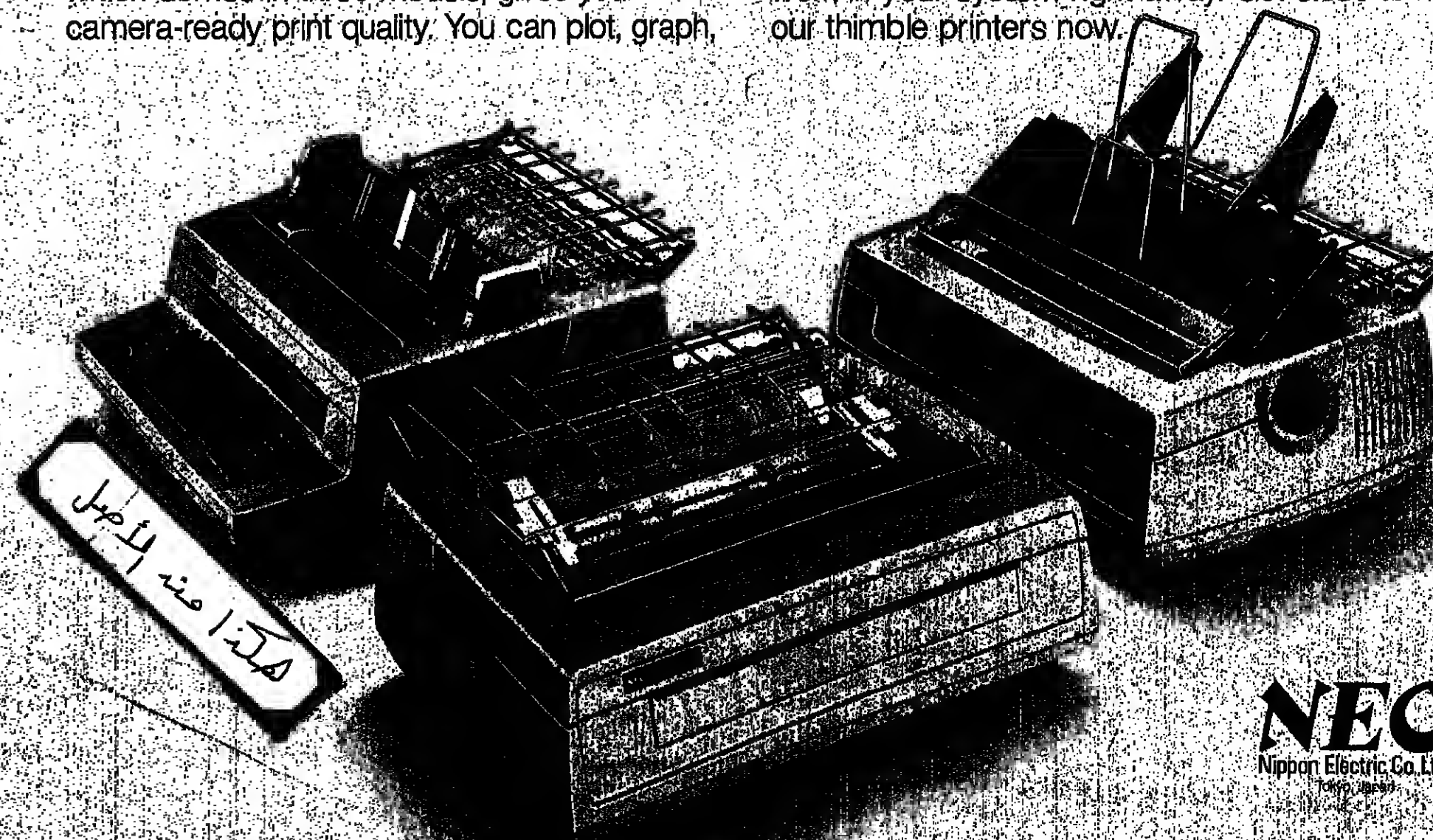
Michelle's Privateview appears in debate form this week on page 16.

You have every reason in the world to switch to NEC's "thimble" printers.

Here are 128 of them.

The secret's in the thimble. It has 128 characters, instead of the more usual 96. You get 36% more flexibility in handling paperwork than with most of the daisy-wheel and golf-ball print elements of other printers. In English, French, German, Scandinavian, name it. And one thimble will last more than 30 million clear impressions. Quietly, quickly. And that's just for openers. Thanks to our own LSI and microprocessor technology, the NEC Spinwriter Series 5500, which comes in three models, gives you camera-ready print quality. You can plot, graph,

superscript, subscript. Tab horizontally or vertically. And print bidirectionally. Changing thimbles and ribbons is a snap. Also, system modularity means your Series 5500 printer will grow as your requirements grow. And one of the nicest things about it all is that it really won't cost you a thing to switch. 7 interface capabilities, including those for Diablo, QUME and Genronics, means the NEC Spinwriter is ready to work in your system right away. Get close to our thimble printers now.



NEC
Nippon Electric Co. Ltd.
Tokyo, Japan

For more information, please contact:
NEC Telecommunications Europe Co. Ltd., 100 Brook Street London NW1 3HP, UK. Tel: 01-388-6100. Telex: 281914.
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Helping hospitals in UK to catch up...

US hospitals' technological lead over those in the UK may be shortened by the UK launch of two hospital administration and "patient care" systems.

Both systems have been operating for some years in the US and have been adapted for use in UK hospitals, which are many years behind America in computerisation.

The two companies are EIDS World Corp (UK) and British Medical Data Systems, formed as a joint venture between BOC Data-ware and the US company Shared Medical Systems.

After more than 18 months of development, British Medical Data Systems will be announcing its system, known as Action, in February. The American version of Action marketed by Shared Medical Systems is already operating in more than 600 hospitals, the one major change which had to be made for the UK being the removal of the facility for billing patients when they leave.

Ironically, BMDS' first order is for the Cornwall Hospital in London, a private hospital. However, the company emphasises that Action is suitable for any hospital in Britain.



NATHAN... expecting a million pounds' worth of business.

BMDS launched its Patient Care Information System (PCIS) last month. Marketing director Russell Nathan told Computer Weekly that PCIS is expected to generate at least £1 million worth of business over the next 18 months.

This represents about 10 hospital orders at an average value of £100,000 apiece.

At present, NHS computing is confined mainly to the regional level, and to specific functions in individual hospitals.

At the hospital level computers are used mainly for patient records, handling admissions and visit schedules and in laboratory work, for the collection and analysis of data.

The systems offered by ECS and BMDS, however, are far more comprehensive, tying together almost all aspects of hospital administration. EDS' package is an on-line interactive system, available in modules so that a hospital can choose the parts most suitable to its requirements.

These might include bed reservations, out-patient and casualty statistics, or automatic facilities for admission of new-born babies.

In addition EDS claims that one of the big advantages of PCIS is that it can take care of the wide variety of orders for services and materials that can bedevil a large hospital. Much wasted effort and frustration often goes into tracking down routine requests from wards,

Patient Care Information System from EDS is on-line, interactive and modular.

theatres and out-patients, pathology labs and supply departments. PCIS will control the ordering, design and auditing of requisition forms.

Though well-established in the US, the only European user of PCIS to date is a 2,000-bed hospital in Liège, Belgium, though EDS is now engaged in serious discussions with two area authorities and hopes to clinch its first UK sale early in 1981.

Both the EDS and BMDS system will be based around a central store of records, supporting a

number of terminals distributed through the hospital. An average-sized, 350-bed hospital would require about 10 terminals.

EDS will be using Univac V-77 minis and BMDS, DEC equipment. In both cases the minicomputers will be based on site.

The installation of an integrated hospital computing system will, it is hoped, unburden senior medical staff and nurses of considerable paperwork and enable them to devote more time to the patient. The systems are more to be particularly user-friendly, requiring very little

retraining of established personnel.

On the wards themselves much time should be saved by the ability to order drugs and special diets the press of a few buttons.

The launches come at a time when a new strategy of computerisation is being prepared within NHS. It is now recognised that the absence of the motive to make profits the UK has fallen way behind other countries in its use of computers for hospitals and a centralised administration in the NHS.



Permanent international Prestel service expected by next July

PRESTEL International is to become a permanent service probably from next July, and over 90% of the market trial participants are expected to continue to use it, Prestel deputy director Mike Ford said last week.

Ford, who is in charge of Prestel International, said that a further eight countries including Bahrain, Bermuda and Norway had joined the original seven in the trial, although with only one or two terminals in each.

The permanent service will be based on a GEC 4080 in London and a second in the US is to be added by the end of next year, linked to the first and holding identical information.

Access to public information on the system will be via a network of leased lines terminating in multiplexers in the participating countries. But private information belonging to closed user groups will have to be accessed via public networks, either packet switched or telephone, because of PTT regulations.

British Telecom's IPSS has been used for access from the US during the trial, and Euronet is likely to be used extensively in the permanent service.

Logica will continue to be the main overseas marketing contractor and it plans to set up a separate wholly-owned subsidiary to handle Prestel International.

Competition would be expected

from other types of computerised information service, Ford said, "but we feel Prestel International fits in a gap between simple telex and sophisticated specialised high-speed data interchange services."

Terminal supply would provide an opportunity for British industry, Ford said, although British Telecom and Logica would not actually be supplying terminals. In Germany and Holland, terminals built for the local Prestel-compatible services were being used in the Prestel International trial.

Other terminals were supplied from the UK by Decca and by the Japanese firm Sony which designed and built them in its Bridgend, Glamorgan, plant.

Participants now wanted improvement in the quantity of information available and to know what the trials would be.

Out of 150 companies using 320 terminals in the trial, 73 put information into the system, 43 for their own private closed user groups, four for subscriber closed user groups and 26 for general availability. Over two million accesses had been made to the 20,000 frames held on the system since the beginning of the year.

Ford and Sullivan changed its plans for a closed user group of subscribers to making executive summaries of its market research reports available generally at a price per frame of 50 Prestel International charging units (currently 10p).



FORD... "a further eight countries have joined in the trial."

equivalent to 50 pence but not tied to this conversion rate).

Other uses for the service included daily news from the Wall Street Journal which was available before the paper hit the streets, a supplement to Lloyd's Register of Shipping and commodity prices updated every few minutes by FinTel.

Prestel's lead over rival systems had now actually widened, director Richard Hooper said. Bell Canada's Telidon trial had been delayed from last January till next April with the number of terminals cut from 1,000 to 600.

The French-Telnet system was also believed to be expecting a delay from its April target date and to be planning to use central computers rather than relying on information providers' machines as originally intended.

Cheaper UK 9,600 bps modem is intended for Europe

A DROP of £1,000 in the price of a 9,600 bps modem is promised next month by Reading-based Microm-Borer, European subsidiary of the innovative Californian data communications company Microm, which claims to have created the market for statistical multiplexers virtually single-handed.

Microm-Borer's UK-designed 9,600 bps modem will cost about £2,600, is aimed at the European market and will conform to CCITT recommendation V29; unlike its 96 LSI predecessor which is claimed to give a better performance than the V29 specification follows.

Launched a year ago, the 96 LSI is said to have done well in the UK but to be almost unobtainable on the Continent. The three-year-old 48 LSI 4,800 bps modem, of which nearly 1,000 have been sold in the UK, will also be complemented by a CCITT-compatible version costing about £1,300 and available in the summer.

The company aims to develop the European foothold gained through selling OEM to Philips and the Dutch PTT modems, including 300 and 1,200 bps devices and data central-site models.

PTT sales have not included British Telecom so far, but the company has responded to its invitation to tender for 1,200 bps two-wire full-duplex modems.

Plans made since Microm bought Borer from its Swiss security company parent in October centre on enhancing the UK-designed range of modems, some of which will be used to replace the bought-in modem boards built into Microm's US-made multiplexers, and pushing Microm's products vigorously in Europe.

Microm itself has now sold 20,000 of its two-year-old Micro800 statistical multiplexer and climbed to number 22 in the Datamation league table of data communications companies. OEM customers for the Micro800 include Coder and General Data-Comm.

Rapid growth has been sustained with pre-tax profit levels on

sales of at least 20% over the last three years, and it is expected that the US law requiring companies to go public when they reach a certain size will take effect some time next year.

Microm's latest product, the Micro600 port selector launched in the UK last summer and in the UK in November, has forced a change from selling products over the counter for do-it-yourself installation to providing support by field service engineers.

Pricing starts at £3,000 for a basic table-top device which can be expanded to handle up to 12 channel-ends configured as terminals, computer ports or line drivers. A rack-mounted version starts at £6,000 and can be expanded up to 496 channel-ends.

A typical system—equipped with channel driver boards and control options such as statistical traffic logging, port monitoring or restricted access to certain ports from certain terminals—would cost between £15,000 and £30,000.

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Rapid growth has been sustained with pre-tax profit levels on

Big investments in Ireland predicted

A STUDY into the impact of microelectronics and computer industry developments on the Irish economy is being carried out amid predictions that one out of every two jobs in these industries being established within the EEC will go to Ireland over the next year.

The head of the Irish Industrial Development Authority, Michael Lowry, who has been responsible for bringing major computer firms into Ireland, has predicted that by 1985 a total of 30,000 Irish workers will have jobs in these industries.

The study is being carried out by the National Board for Science and Technology, in close consultation with the Confederation of Irish Industry and the Irish Council of Trade Unions. Government departments and state agencies are also involved.

The first phase of the study has already been completed. It covered the present state of computer applications in Ireland, and indicated that the country is well-placed to benefit from new computer industries.

The second phase will examine all sectors of the economy to provide information for recommendations on future national policies. Already the study group is finding clear evidence that there must be

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The second phase will examine all sectors of the economy to provide information for recommendations on future national policies. Already the study group is finding clear evidence that there must be

Cork and Galway plants

THE inflow of computer company investment in the Irish Republic continues with the Irish Development Authority's announcement of two new projects.

Beehive International of Salt Lake City in the US is spending \$2.7 million to set up a VLSI plant in Fermoy, a small town in North Cork. The factory will

eventually employ 60 people and Beehive has indicated that it will consider setting up a research centre later.

In the west of Ireland at Fortuna in County Galway, MDS Systems of Orange, California is setting up a plant to manufacture PCBs. The factory will eventually employ 40 people.

MICRO NEWS

AMD aims to be leader in telecoms industry

FOREMOST in the minds of corporate executives at Advanced Micro Devices is the potential market for standard large-scale integrated circuits in the telecommunications field and not, as trends would dictate, the development of a generation of 32-bit processors.

Telecommunications is seen by AMD to be the fastest growing market in the world for the 1980s. The company's aim is to be a major factor in this industry; that is, to be one of the top two or three companies, if not the first.

Bob Grossman, who looks after corporate affairs at AMD in Sunnyvale, estimates that the telecommunications market will eventually be worth \$4 billion.

His figure is reached on the basis of an estimate of 400 million phone lines in the world today, increasing at a rate of 40 million each year. The mechanical unit inside all these phones usually costs about \$6.75 to the US, and if replaced with a single chip modem priced at \$10, the cost would be \$4 billion.

Deep end

The single chip modems which AMD intends to produce to replace the mechanical unit would carry out extra functions such as number storage and forwarding calls. Grossman considers that users will be willing to pay more for these extra convenience facilities.

AMD plans to enter the market at the deep end with third generation devices, having learned from the mistakes made by others in the development of the first two generations.

Grossman explained that this will produce certain benefits, like being aware of the constraints when dealing with complex digital signal processing.

Initial telecommunications devices are expected to be seen at AMD early next year. They should

Compiler for Pascal

A PASCAL compiler for use with Intel's 8088 and 8086 16-bit microprocessors is now available from Rapid Recall. Pascal-88/86 is designed to run on the Intellex Series III development system or on the Series II or Model 800 systems with a model 556 upgrade package.

The compiler has been expanded by Intel so that the machine code can be linked to object files. Two other additions are a set of predefined functions to perform direct port I/O in Pascal, and a procedure to compile for execution when an interrupt is received.

Multi-user systems featured at US trade show

A WIDE spread of multi-user multiprocessor microcomputer systems was exhibited at Comdex, the US trade show aimed at OEMs, dealers and distributors. Delta Products had on display its implementation of Digital Research's GEM/MP operating system running CP/M.

All terminals interfaced to a hard disc, allowing shared access to files by passing requests to an MP/M processor. This method differs from the conventional way of developing operating systems to allow a single CPU to be shared as in Cromemco, Altos and Onyx equipment.

In Delta's method, each user is serviced by his own processor,

Advanced Micro Devices, the US semiconductor company based in Sunnyvale, California, aims to be a major contributor to the telecommunications device industry, and sees it as the fastest growing market in the world in the 80s. Micro News visited the AMD Sunnyvale headquarters and discussed with corporate affairs men Bob Grossman the company's current situation in this market, and what AMD intends to do in the 32-bit microprocessor field.

There will be some product overlap between the two plants to allow some devices to be produced in both technologies. The AM28000 family will continue in MOS alone, however, and the bi-slice family, the Z2900, will continue in bipolar.

Production of the world's first 16-bit wide bit slice microprocessor (CW, September 18), the AM2916, is due to begin this quarter in sample quantities only.

The 2900 series is being used for processor emulation in at least one model by nearly all the world's major microcomputer companies. An 8-bit wide slice was not considered for development because in most applications the devices are configured into a 16-bit format anyway. The AM2916 in a 48-pin package will have an instruction time of 100 nanoseconds and will be able to execute instructions in either 16 or 8-bit modes.

"It is the peripherals that produce the revenue. The CPUs could be given away free, to attract more peripheral sales. The cost of peripherals for 32-bit processors tends to negate the advantage of having a single chip 32-bit system," said Grossman.

Will there be any second source deal between AMD and Zilog at the 32-bit level, similar to the Z8000 agreement where both companies are developing parts of the family?

"Our agreement with Zilog is only for the Z8000 family. We will have to wait and see what Zilog does in the 32-bit market before we can say anything along those lines," said Grossman.

Development

He pointed out that many of the improvements made to the Z8000 chip came from AMD, and the two companies worked closely on the family developments. Faster versions of the 16-bit chip are planned by AMD, with or without masks from Zilog.

At the moment AMD is co-operating on the development of peripherals for the 8000 family. Some 26 devices have been planned with 11 already available in sample quantities, including the 8065 burst error processor, the 8068 encryption chip and the 8160 error detection and correction circuit. These three are also available from Zilog.

Expected early this year from AMD are the 8010 memory management unit, the 8030 serial communications controller, the 8036 counter and I/O port and the 8038 I/O interface, all of which are available from Zilog. The 8016 direct memory access transfer controller and the 8052 CRT controller will be introduced this year by both companies.

Claiming to be the seventh

largest semiconductor company in the US and twelfth in the world, AMD plans in the future to be a \$500 million company, and it will have the capacity. The new plant in Gilroy, California, will be equivalent to the Austin MOS plant in Texas for bipolar technology.

The new plant will be started in the first quarter of this year and is expected to be in production by the end of 1981. AMD feels that up to now the industry has neglected bipolar technology in favour of MOS and CMOS technologies.

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Claiming to be the seventh

by Eileen Stainer



A NEW addition to the Vector Graphic range of microcomputers, VIP (Vector Intelligent Partner), is now available from Almare Data Systems, the sole UK distributor, for about £2,125. VIP is based on the 8100 bus and comprises a Z80A processor, 56K of dynamic RAM, a separate 315K byte floppy disc drive and runs the CP/M operating system.

Mostek tries 64K RAM

SAMPLES of Mostek's 64K dynamic RAM, the MK4164, are now available in limited quantities. The company says it has purposely delayed the release of the device in order to have a quality product that could become an industry standard in a similar way to the 16K dynamic RAM.

The 16-pin packaged device runs off a single 5V supply, has a 150 nanosecond access time with a 325 nanosecond cycle time, and a maximum power dissipation of 300 milliwatts active and 20 milliwatts standby. It features a 64K internal refresh counter for automatic refreshing with no one.

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WANG

Making the world more productive.

French aim at US databank market

FRANCE is to be equipped within 19 million francs for legal information which will go online to the country's courts, law departments, business firms and local government in April.

The system, which is designed to digest four million court decisions and 15,000 pages of the French official gazette each year, will be connected via the Transpac data transmission network to a CIP (Computerized Information Processing) software will be used.

The French authorities regard this venture as a major challenge. An French technology in a field in which the Americans dominate.

About 70% of the 360 databanks now operating in the US-made France operates only 10% of these banks, representing a mere one per cent of world turnover.

As an incentive to Sydon, the Ministry for Industry has granted a 49.3 million subsidy equal to the sum put up by the venture's partners. The National Association of Legal Advisers, the National Federation of Tax Advisers, the National Company of Accountants and the Chartered Accountants' Guild have all invested in the Sydon project. Sydon could prove a godsend to the French legal profession as well as to the business community.

Lawyers devote at least one quarter of their time to searching for documents. It has taken ten years to compile the input for a databank whose fields of information will cover company, trade, property, social and tax law as well as all the laws, decrees, regulations, circulars and rulings of the Council of State (France's highest court), equivalent to the House of Lords, and the wide range of French courts.

The Sydon databank will be accessible for 11 hours daily and on Saturday mornings at a cost of 1800 francs. This subscription will cover ten hours of connections. Extra time will be billed at 170 francs.

Ray Fortune is the first European to head the whole Data General operation in Europe as vice-president and general manager. His rise through the ranks included a

spell as UK managing director. He talked to KEITH JONES about the company's development on this side of the Atlantic.

How Data General sees its fortunes in Europe...

THE recession in Europe, as far as Data General is concerned, means that customers are taking longer to make decisions about buying kit, rather than not buying at all.

At the same time Data General's European general manager, Ray Fortune, was reluctant to forecast the company's European turnover this year with any precision, let alone whether it would achieve a growth rate similar to the impressive leap to \$166 million made in the financial year ended September 30, 1980.

While expecting turnover this year to exceed \$200 million, Fortune explained, "Our lead times are 90-120 days, far shorter than those for mainframe systems suppliers, so any big recession hits us quicker."

Having served as European sales director for more than three years before assuming the role of general manager, Fortune understands the nature of DG's total European market and the company's US business.

He pointed out, "In Europe Data General has a much higher percentage of small business customers than in the US. There is a lot more systems house business here and about 65% of turnover is from OEMs. But there are for fewer very large companies, universities, technical OEMs or central government customers in Europe."

According to Fortune, central

government is the only market sector where DG has encountered nationalistic resistance to buying from a US based supplier.

"Maybe our people in France do not even try to sell to central government," Fortune commented, "but I know we have had some government sales in France and a lot more in West Germany and the UK. Outside central government I am not aware of any DG contract being affected by nationalism."

Asked if manufacturing in Europe might encourage more business on this side of the Atlantic, Fortune remarked, "We will not manufacture over here simply for political reasons. We are better having the least cost product by concentrating manufacturing in the US. In any case machines built, say, in the UK are not considered domestic in West Germany, France or Italy despite the EEC. Moreover, the value added in Europe to our kit is very high. We ourselves employ between 600 and 700 maintenance people and many of our customers, like Plessey, GEC and QinetiQ in the UK, re-export our machines as part of their products."

Asked if there were any problems caused by DG in the US not understanding the European market Fortune pointed out, "We became a multinational only three years after our foundation and all international general managers for the last eight years have reported

to the same man at headquarters senior vice-president Herb Richman. And our vice-president of product planning at Westboro is Barry Fidelman, who was European general manager for four years."

At the same time Fortune acknowledged that DG had encountered problems in the early days, for example with keyboards, national engineering standards and the translation of brochures. A more critical problem, peculiar to the small interactive systems that are DG's speciality, was the need for interactive screen languages for non-English speakers.

Fortune remarked, "You cannot expect a small user South of Lyon to understand English."

As well as confining its manufacturing activities to the US and the Far East, Data General has also passed Europe over as a possible location for software development activities.

Asked why, Fortune explained, "The considerations are purely economic. The US is less expensive than Europe, particularly for hardware development. Two years ago we looked at the possibility of locating some software development in the UK but decided it will still be too expensive. But we have no policy against carrying out development work in Europe and we are looking at possibilities all the time."

On the marketing side, DG is

already well established in Europe with 44 branch offices including 11 in the UK and Ireland, seven in West Germany, seven in France and six in Italy. The latest market to be attacked directly, rather than through distributors, is Spain where offices have been set up in Madrid and Barcelona.

Explaining why he had high hopes for Spain, Fortune pointed out, "The Spanish market is small business oriented and demographically similar to Italy which ranks in size with France and West Germany as far as DG is concerned."

Asked about DG's main competitors in Europe, Fortune commented, "We meet Digital Equipment everywhere in the technical market but never see them in the commercial sector. IBM is less strong than DEC in the technical area, but we always confront them when making a commercial sale."

Siemens competes with some of our technical OEMs but is never encountered in the commercial sector.

"CII-HB is very strong in France and sells a lot of Level 6 machines to its mainframe base, but otherwise we do not normally meet them. With ICL we sometimes compete against the System Ten, depending on the country."

Competition from Japanese minicomputer suppliers is virtually zero in Europe, although Fortune pointed out that in Japan itself Data General now owned 50% of a joint venture company called Data General Nippon, the remainder of the firm being held by Japanese financial interests. It took over from the Nippon Minicomputer Company, a company which built DG machines under licence.

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Ray Fortune (left) went back to school before taking up DG's top job in Europe - more precisely to the Harvard Business School. There he was subjected, with more than 100 senior managers from all over the world, to the Program for Management Development, a Harvard course involving a most complex company case studies.

Meanwhile in Europe DG is expected to announce the first of its 32-bit VAX within a few weeks, the first of them being in either Sweden or the UK. In addition a 16-bit version of DG's AOS operating system totally compatible with AOS used on DG's Eclipse has now been announced.

The software for another significant DG product, the Xodac work architecture announced in 1979, has been bought by several customers in Europe. Networks based on Xodac have been implemented yet, but links have been established by itself between its operations in Europe and the US but its architecture has not even been implemented yet on the in-house work.

The Az-Tex word processing package announced at the same time as Xodac has created interest, but Fortune said a further development in the technology field would be wait on the definition of standards ourselves, he commented.

Despite reports that DG is looking to make acquisitions, companies in areas like systems, data communications, process control, Fortune said the company was not looking around in Europe.

He remarked, "Our growth continues to be organic primarily through the biggest proportion of DG's turnover in Europe - about 27%."

THE Department of Information Communications is to set up a sub-committee. They will do preparatory work on standardisation and radio communication might interwork with the communication after the formation of the British Telecommunications Bill.

The decision was taken at a second meeting of the committee which was set up to provide a means for the government to consult the industry on the issues for liberalisation of the telecommunications monopoly and related issues.

Members include trade associations, manufacturers' associations, and associations, the British Standards Institution, the Central Council and Telecommunications Agency and British Telecom. The committee also welcomes views from outside those bodies.

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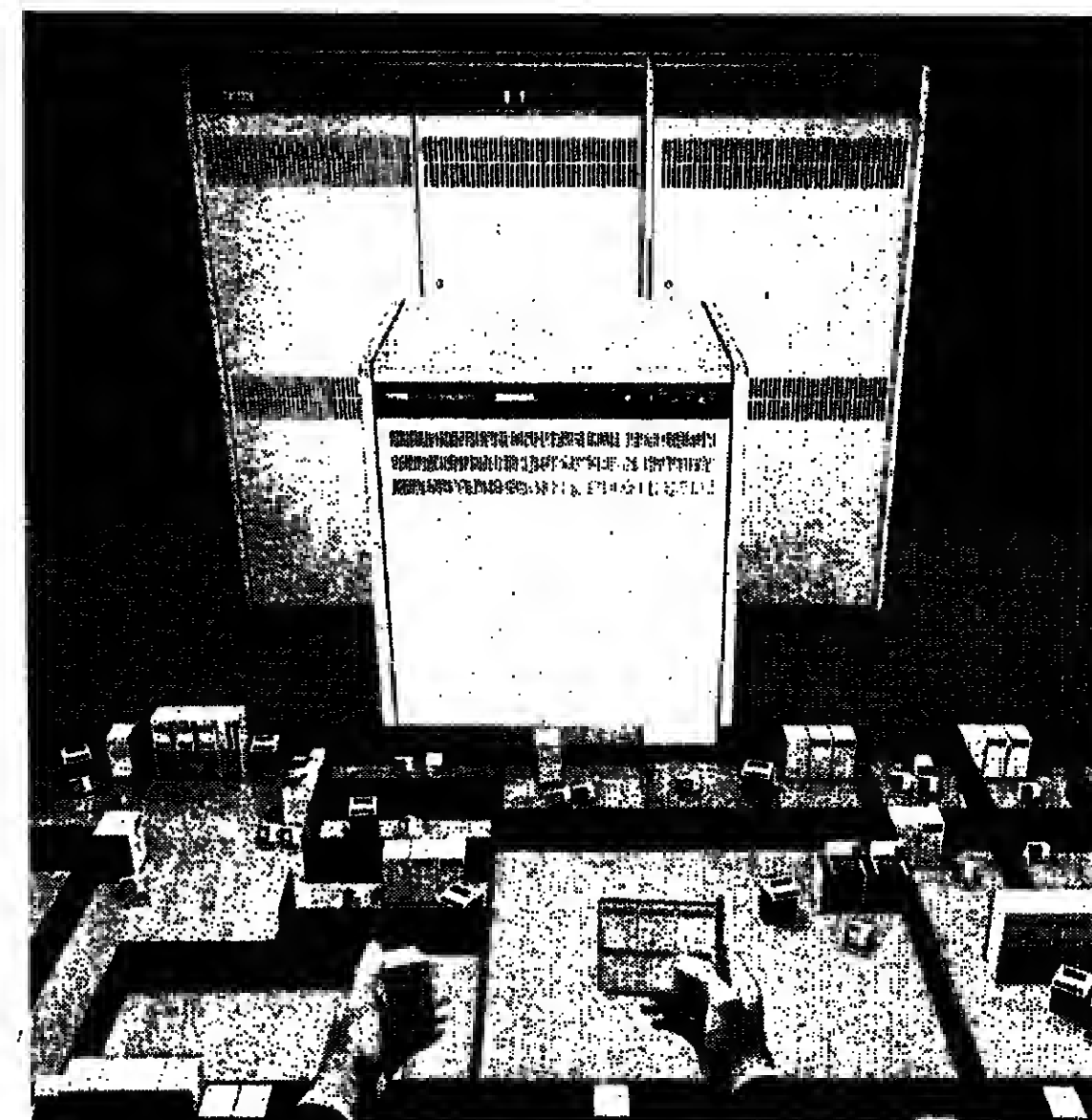
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Small freight operators' fears on new air cargo system 'entirely false' - NDPS

SMALL freight forwarders and agents could be denied access to the ACP 80 air cargo system, alleges Dr Eric Haworth, director of Monchessier-based Management Control Systems.

ACP 80 will replace the LACBS (London Airport Cargo Electronic Processing System) used currently at both Heathrow and Gatwick. Haworth's company is a DEC distributor specialising in freight transport applications and he made the claim after one of his clients received a letter from the NDPS, the commercial branch of British Telecom contracted to provide the computer.

The letter stated: "Consideration to the implementation of the

interface links for agent companies will not be considered until after October 1981."

Haworth's allegation was dismissed by Alan Saunders, chairman of the ACP 80 systems group, who pointed out: "The ACP 80 development is under the executive control of the ACP 80 steering body on which all sectors (freight forwarders, airlines and customs) are represented."

"It is incorrect therefore to attribute ACP 80 policy to NDPS, whose role is that of the main contractor for the ACP 80 bureau service."

An NDPS spokesman also responded to Haworth's charges: "The suggestion that ACP 80

facilities are being reserved for a privileged few is entirely false," he said.

"All companies have had an equal opportunity for access to the ACP 80 bureau system and everyone who has applied within 15 months of our being awarded the contract will be accommodated on the system in time for its October 1981 launch."

"Latecomers will be accommodated as soon as possible after that. About a quarter of intending users in the agent's community will share terminal equipment with other agents, an arrangement used widely by LACBS for ten years," the spokesman added.

Meanwhile, Videcom has won

an order worth \$400,000 to supply NDPS with 205 terminals, a Videcom spokesman estimating that there will eventually be 425 terminals supporting ACP 80.

Videcom supplied replacement terminals for LACBS and says that the new system "will provide several significant advances over its predecessor."

"It will handle exports as well as imports; sites removed from, as well as on, the airports; and it will provide online communications between terminal users, the ACP 80 bureau at Harmondsworth and various airline computers."

DATA processing company Interactive Data Systems, based in Milton Keynes, is expanding its new premises to increase production of \$100 computer boards and the Sarcos microcomputer range.

West Germany is likely to be the largest market for the home computer, taking 32% of the shipments during 1983. The UK and France will follow, taking 22% and 14% respectively. The low growth is attributed to the high prices in Europe compared with the US. IDC analysts feel, however, that prices will fall when Apple and Commodore start to manufacture in Europe.

In education the annual growth rate will be 10% to 15% with high-end home computers being introduced in the UK. German shipments will reach 7,500 by 1983.

The security market will grow at an average annual rate of 30% by 1983. IDC expects that over 100,000 Western European homes will have desktop computers by the end of 1983.

Exclusive top management group set up

JUST how far the implementation of the Office of the Future has progressed is the subject of an exclusive regular meeting of senior management services personnel, organised by Ron Yearley of the BIS Group.

A group of about 30 will hold quarterly meetings at the Reform Club in London, to exchange current experience of the introduction of information technology in the office. The first will be on January 20.

The idea was the brainchild of the late William Morby, former head of management services at Lloyd's of London, the underwriting corporation.

Among those attending will be David Eggleston, a deputy general manager of computing services at Lloyd's of London, and Dr John Macdonald, chairman of the consultancy of the same name.

BRITISH research into Artificial Intelligence is "on the rise", following the establishment of a joint project by GEC and the Science Research Council, into using an array processor.

That is the view of Donald Atkinson, Edinburgh University, who will be carrying out the study. It is finally pulling out of the doldrums in which it has been since the 1975 British AI Report.

The project (CVS December 11, 1980) will involve a joint effort between GEC and the Science Research Council, and will look into two applications: analysis of signals from medical ultrasound machines and visual interpretation of engineering parts, enabling a robot to pick parts out of a bin.

Using the Chip 4 array processor should provide increases of speed in this work of the order of "hundreds of thousands," Michie said.

The array processor also makes programmable problems which would otherwise be too complex, Michie adds, enabling systems to be devised which "correspond to a human way of thinking."

It is also necessary to

Gearing up for new telecom era

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The ops manager who prefers to take on school-leavers

PLENTY of people, both in politics and business, are ready to pay lip service to the idea of employing school-leavers. But very few have a job for them.

This is not the case, however, at the Royal London Mutual Insurance Society in Colchester, where the manager of computer operations, Graham Lund, says: "I would prefer to take school-leavers. It isn't all done in a spirit of unbridled altruism, because he adds: "If you get them young, you can mould them."

What Lund looks for in a school-leaver is evidence of an active temperament, and he thinks enthusiasm for sport is a good guide. "Ops," says Lund, "are doers rather than thinkers, although this doesn't mean they can't think." He uses the IBM programmer's aptitude test and finds that, in academic qualifications, CSBs are acceptable.

Lund encourages school parties to visit the installation. "I'm appalled," he says, "at some of the educational establishments I've seen. It seems to be the thickies in the lower bands who are given computer studies."

Responsibility He would not contend that the education system should churn out purpose-built employees because ultimately "it's the company's responsibility to train, for it is the company that benefits."

"The training for my organisation," says Lund, "and I don't believe you can generalise on standards. What is good for one company is not good for another."

The Royal London ops department has never used a TOP's graduate.

The first three to four months a trainee spends with the Royal London are devoted to an appreciation of what goes on at the site. They start in a bits and bytes way learning system fundamentals, and visit control and data prep areas. This is followed by equipment training with days on the printer and card reader.

Parallel Recruits are then sent on an Infotech basic operator training course because, says Lund: "Info-



THE OPS MANAGER: Graham Lund has been with the company for nine years - which is longer than he expected on joining as a shift leader. An advocate of a well-defined career path, his belief in operations has taken him to a five-figure annual salary.

tech courses are good, and I believe in sending people away to mix with others at their own level."

He wishes that IBM would run a worthwhile course for trainees, but doesn't see why individual companies should be shy of conducting their own in-house training, especially at a higher level.

In-house training runs in two parallel ways. Trainees are assigned to a shift supervisor and the idea is that they should meet for half-an-hour a day to discuss CPU, JCL, how to enter power cues, and so on. More formal are the in-house courses such as that on JCL being given by Peter Sayward.

Lund advocates well-defined career structures and on being appointed operations manager he increased the number of levels to make a promotion path within his department. There are seven grades of ops on the site, including the manager.

Desk job

At the bottom of the pecking order the trainees - or junior operators as they are called - start on £3,400 and are put on £4,000 when they qualify some nine months later. The maximum for an ops, including shifts, is £6,000.

Lund believes in a "distanced" style of management and that it is not his job to be a jumped-up button pusher.

"Two steady ops managers," he says, "want to get their hands dirty. Although they should have an ops background, their job is behind a desk directing and forward planning."

Warning to the theme, he continues: "Ops managers aren't super operators; it's their job to manage staff. I rely on my management team."

That team is Mike Stubbins, assistant manager, Paul Sharp, the ops supervisor who is responsible for day-to-day running of the centre; Kevin Cobuch, support group supervisor who has 18 months as an IBM engineer as part of his CV; Mrs. Lesley Mayhew in charge of data prep. Fully staffed, the operations group has 36 people.

Shift system

Another indicator is that the DPM is an assistant general manager of the company as a whole. At present the site has a 4-megabyte IBM 4341 running under DOS/VSE Release II with Power VS. An additional 4341 will be delivered by August 1981 to cope with the extra burden of putting 6,000 employees on payroll. Teleprocessing work is kept to a minimum and although there is long term commitment there is only one link with the central office in London for actual work.



OPERATIONS SUPPORT GROUP ASSISTANT: Peter Sayward tied six-month spell as a printing apprentice before he joined the Royal London. During his seven-year career he has worked as an operator and now, as part of his job in the support group, he is preparing JCL teaching material.

Beware of Basic when badly taught

SOMETIMES it is harder to teach someone who has half an idea than the person who knows nothing at all.

Dr Roger Oakley, a teacher of computer programming at the De Havilland College, in Hertfordshire, certainly feels this about his students who as prospective programmers have trained themselves in Basic from do-it-yourself books and manuals.

He condemns the current widespread and almost indiscriminate use of Basic in education as having a damaging effect on professional programming standards.

"Basic has become the language of the microcomputer," he says, but goes on to question how it is taught, when it is taught, by whom, to whom, and why?

It was not always such a popular language. Before the advent of micros it was used mainly by scientists and engineers who appreciated its simplicity and the lack of need for extensive training. Run times, though, were long, and computer time expensive, so professionals tended to write in other, pre-Basic, languages.

Ideal tool

When the chip boom came and TV games, calculators and personal computers mushroomed in every shopping precinct, Basic really took off. As an off-the-shelf interactive language, easily learned by the layman, it was ideally suited to the new technology that made computer time cheap and available, and brought it down to street level.

Last things first - why is Basic taught, and by whom?

Dr Oakley: Computer education is now recognised as an important part of the secondary school curriculum and the traditional view has always been that it is through actually programming a computer that the student will realise two fundamental things. One, that computers are essentially stupid and need things spelled out simply and completely before they can do anything properly; and two, that computers work under the control of people - even a schoolchild can exercise that control once he or she has learnt an appropriate programming language.

Basic provides an ideal tool in both respects, but there is another, less defensible reason for its adoption. The average school has no-one with any real expertise or experience in computing or data processing, so when it acquires a micro, a maths or physics teacher who "did a bit of Fortran at college" becomes the computer studies tutor. He teaches himself Basic one step ahead of the class, and the course is under way. Bad programming habits once learned are not discarded, and many potentially good programmers have been spoiled in this way.

When is it taught? Dr O: The most frequent encounter with Basic comes for schoolchildren at the age of 13 or 14, when they are introduced to programming as part of a CSB or O-level course. Many others meet Basic for the first time in their maths lessons because their teacher is trying to generate some interest in the classroom.

For the pupil who is not going to become a computer professional it does not matter too much, but the prospective programmer or analyst should not start with the idea that "computers think in Basic" or "computers do maths".

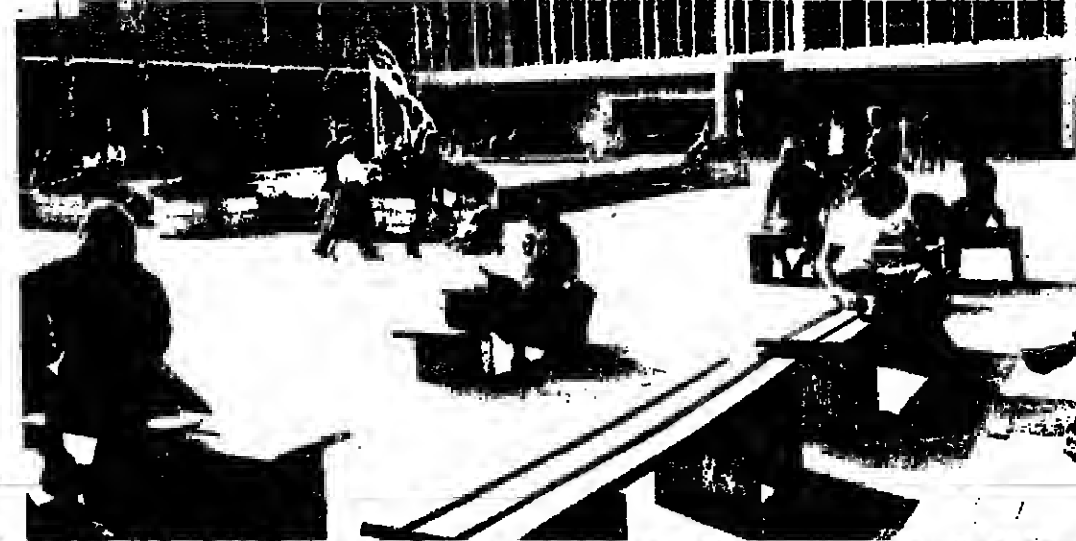
To whom is Basic taught? Dr O: At present, getting on for half our young people have learned some Basic by the time they leave school, and this will increase as facilities for practical work improve. At the moment, opportunities for computer education depend as much on the particular facilities at a school as on the ability and interests of the pupil.

How is it taught? Dr O: In a word - badly. I doubt if there is any completely satisfactory solution to the Basic problem but two steps in the right direction would be:

Firstly, to set up a national policy on computer education in schools, with comprehensive training for teachers. Teacher salaries are too low to tempt enough well-qualified people from the computer industry, so we have to

be prepared to retrain teachers of maths and other disciplines. These courses must include commercial computing and data processing as well as computer science.

Secondly, Basic should not be taught as the first or only programming language to any student, and particularly not to potential programmers. An introduction to the art of programming via a simple machine code and assembly language, to establish fundamental programming concepts, would start all students off in the right direction. This would give them an awareness of function codes, binary addresses, registers and store locations, which must help any programmer to do his job better, and provide a valuable introduction to subsequent high-level languages. Even non-vocational students would benefit if their knowledge of programming had more depth and variety than Basic alone can offer.



Students at Essex University contemplate the academic life, recently enhanced by the opening of a new microcomputing laboratory to handle 300 undergraduates a year.

Graphic approach to learning

LEARN programming with a graphic or two. The Computer Science Department of Essex University at Colchester has long believed in their effective use during the early stages of learning, and has chosen to equip its new Micro Teaching Lab with 17 of the Vector Graphic System 16 units operating under UCSD Pascal.

"They were chosen," said Iain MacCallum, director

of the department, "because of their inherent reliability and high standard of construction and value of money."

Three hundred undergraduates a year will be able to use the new lab which will complement the University's main DEC 10/90 computer service, and provide UCSD with top-notch facilities for teaching programming.

THE BEST THING NEXT TO A MIN-COMPUTER

Open University micro course aims at industry

TALKING of new ventures for the New Year, the Open University has recently advertised a course on microprocessors in industry.

In full it is Microprocessors and Product Development: A Course for Industry, designed to show how incorporating a microprocessor affects product development. It is aimed particularly at executives who have to make decisions about new products investment and managers involved in financial administrative affairs, but is of interest to all technical staff.

Puzzler

TWO platelays on their way home from work decide to take a short-cut through a single-track railway tunnel, just as they reach a point three-fifths of the way through the tunnel, they hear a train coming towards them. One man runs towards the train, and the other runs back along the tunnel, at the same speed as his colleague, and he also just gets out in time.

If the train was travelling at a constant speed of 30 mph, how fast did the men run?

See page 37 for solution.

The course is divided into theoretical and practical components and changes the control of your own home microprocessor system the Intel 8048, accompanied by an Experiment Book.

This describes program entry into the system by three methods: using binary codes, decimal codes, and elementary assembly language. The programming emphasis is more on what is involved than how to write, and the whole book takes roughly 16 hours of work.

Written matter consists of six study books starting with an introduction to microprocessors, the choice between them and basic features, it continues with issues of design and development and leads finally to discussing ramifications of microprocessor inclusion into the product.

Each study book is scheduled for about eight hours of study, making a total of 60 to 70 hours for someone without previous knowledge, though the course can be spread over as long or short a time as desired. It can be started at any time and the fully inclusive course fee is £15.

Enquiries and applications to the Microprocessor Project Office, PO Box 188, Milton Keynes MK3 6TW.

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PEOPLE and EVENTS

Top management changes at Honeywell

AFTER 19 years with Honeywell Information Systems, the company's director of communications Allen Keen has retired.

Keen's responsibilities have been in advertising and publicity, both in Europe and the UK. He was behind the mid-States "animals" advertising campaign, featuring "animals" constructed with electronic components. He was also involved in publicising the Emscom computer.

Retirement from the Midlands offices will give Keen the chance to pursue his hobbies of gardening and photography.

Also at the company's Brentford headquarters, Rolf Forester has been appointed director of finance and administration. He joined the company in 1973, and since 1978 has served as controller of marketing. He is replacing Bob Mull who will take over as finance director of financial planning and analysis at Honeywell's systems management office in Minneapolis.

Jim Mitchell has been appointed principal consultant in charge of Geis's Aberdeen office. He joined the company in 1975.

Geoffrey England has left his post as principal consultant with Logica, to take up the job of sales manager at API, Mes.



Keen

David Morley has been appointed product manager, small business systems, at Batic Computing Services, where he has worked for 18 months.

George Lowrie, who joined ITS/ SITA in Frankfurt in 1973, has been appointed commercial manager of the ITS (UK) in Hounslow.

General manager for EDS

EDS World Corporation UK has appointed Harry Richardson general manager. He has been with the company since 1978, and was involved in setting up EDS UK as a supplier of facilities management, consultancy and data processing services to UK clients. He also co-ordinated an analysis of the UK and European markets for EDS products and services in the company's traditional areas of business.

Richardson's involvement in computing began in the Sixties, in merchant banking. Following four years with Beechams, in data processing operations, he spent over eight years in the computer services industry, in commerce, Lloyd's underwriting and banking.

Michelson award winner

THE A. A. Michelson award for 1980 has been presented to David Sehu-macher of the Institute of Software Engineering, for advancing the state of the art in computer system measurement, in particular for his creation of standards for performance reporting and his educational activities in the subject area.

The award is made in the US by the Computer Measurement Group, and other professional bodies, including ACM Sigmatics. Although it is nominally an annual award, there have only been five winners in the last decade, as recognition is given only when there is a unanimously accepted nominee.

Briso Hollowell has been appointed Northern area sales manager for Olivetti Computers. He joins the company from IBM's DP division, where he had worked in a number of sales positions since 1976.

John McGregor-Temple has been promoted by Redifon Computers to manager, field software engineering operations. He joined the company in 1973 and served most recently as national support manager for the UK.

David Sperr is Computer Machinery Company's new purchasing manager. He was formerly materials manager with Honeywell Information Systems.

Bill Gontes has been appointed head of the applied systems division of CTL. He was formerly general manager of Telordering Ltd, a company within the Software Sciences group.

Peter Semason has joined Peter Merrick Associates as sales manager for Time Slot. He was previously manager of the accounting services department of a large bureau. Also joining the company is Linda Taaffe, who becomes customer service co-ordinator for Time Slot.

Nexos names director

Frank McGovern has been appointed director of supply at Nexos Office Systems. Barry Marshall-Johnson joins as Southern regional manager. McGovern has had 16 years' experience in the computer industry, several of which were spent with Plessey. Immediately before joining Nexos he worked for Philips. Marshall-Johnson joins the company from IBM where he worked for seven years as systems salesman in the data processing division.

Mike Tabor has joined Inbuson Management Consultants to head the company's DP appointments and contract personnel services. He was formerly managing director of Thorbar Recruitment and Consultancy Services.

Tony Marlo has been appointed technical support manager at Interplex Inc. He joins the company after five years as product marketing executive with Racal-Milgo.

Reinhard Spangler has been appointed vice-president of European operations at International Computer Programs Inc. He joined the company in 1976, serving as vice-president for marketing and sales for the US sales operation. He is now based in Park Lane, London.

Kelth Lardor has been appointed divisional director C&I/MEG at NCR. He joined the company in 1966 and held various sales positions, serving most recently as area manager, C&I North.

John Myers has been elected vice-president of the Harris Corp in Melbourne, Florida. He was formerly with the Farinon Corp.

Ayoo Cinnamon has been appointed advertising and public relations manager for Business Computers (Systems) Ltd. He was previously with Singer Business Machines.



Carbery

McGinlay

Dataproducts promotions

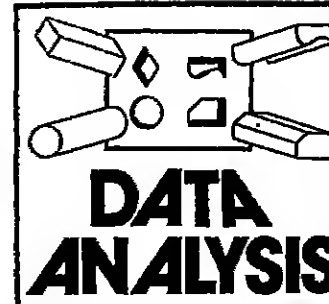
TWO Dataproducts (Dublin) personnel have been promoted. Martin Carbery who has been with the company for 13 years, becomes director of the supplies division. He spent 10 years in engineering, followed by three years in project marketing. Jim McGinlay has been promoted as European marketing manager, supplies division. He joined the division when it opened four years ago. Prior to joining Dataproducts he was London area salesman with Datagel, then an ICI subsidiary.

Michael Rooms and Nigel Wood have been appointed sales executives at Data Logic's word processing division. Wood was formerly management executive with Marks and Spencer, and Rooms joined from Rank Xerox.

Geoff Theakston has joined Consolidated Data Products as sales director. He is director and general manager of Centronics.

David Morley has been appointed product manager, small business systems at Batic Computing Services. He has been with the company for 18 months, working as senior marketing consultant.

John Daele is sales and marketing director at Burndep Electronics. He joins the company from Cambridge Scientific Instruments where he was marketing director.



IN Part 12, the concept of entity sub-types was introduced. Entity sub-types were defined as mutually exclusive groups of entities within the one entity type. They were shown to be important for database design and program and system design. Some general guidelines were provided for determining entity sub-types, by studying the events which affected the entity type and the stable classifications of the entity type.

Inclusive One to Many relationship types

Inclusive relationship type describes the situation where one or more relationships cannot exist unless one particular relationship exists. An example is shown in Figure 1, where a patient cannot have attended an Appointment unless it has previously been made.

Where an inclusive one to many relationship type exists, the procedure is to replace it by a bivalent attribute type. The attribute type is allocated to the entity type on the "many" side of the relationship type.

In the example in Figure 1, the inclusive relationship type "attends" has been replaced by the attribute type "Appointments Attended" with the two values Yes (Appointment was kept) and No (Appointment was broken). This is effectively creating entity sub-types of "Appointments which were Kept" and "Appointments which were Broken", resulting from the events "Person attends for Appointment" and "Person does not attend for Appointment".

convey each of the original relationship type names. The attribute type is allocated to the entity type on the "many" side of the relationship type.

In the example in Figure 3, the exclusive relationship types "Is Booked into" and "Is Resident at" have been replaced by the attribute type "Patient's Ward Status" with the two values "Booked into" and "Resident in".

This is effectively creating entity sub-types of "Patients who are Booked into a ward" and "Patients who are Resident in the ward" resulting from the events "Patient is Booked into ward" and "Patient Resident in the ward".

Where the resulting relationship type is operational, an extra value will always be needed denoting that neither value applies (i.e. the "null" value). In the example which follows it is possible the Patient is neither Resident in the ward nor Booked into the ward (i.e. neither event has yet happened).

Again, two entity sub-types have effectively been created: "Illnesses which have not been Cured" and "Illnesses which have been Cured" which resulted from the events "Person gets Illness" and "Person cured of Illness".

Exclusive relationship type describes the situation where either one or another relationship exists, but not both simultaneously.

An example is shown in Figure 3. A patient is either booked into a ward or is actually resident in the ward. He cannot be both. Where exclusive one to many relationship types exist between two entity types, the procedure is to replace each relationship type by a one to many relationship type and an attribute type having values which

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Special cases of entity sub-types

"Person does not attend for Appointment."

Inclusive Many to Many relationship types

Where one or more inclusive many to many relationship types exist between two entity types, the procedure is to replace all the relationship types by an entity type plus two one to many relationship types. Each inclusive relationship type is then replaced by an attribute type belonging to the newly created entity type. As before each attribute type has two values.

In the example in Figure 2, the new entity type "Illness" has been created and the attribute type "Illness Cured?" indicates whether the illness has been cured or not.

Again, two entity sub-types have effectively been created: "Illnesses which have not been Cured" and "Illnesses which have been Cured" which resulted from the events "Person gets Illness" and "Person cured of Illness".

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Section I — Part 13

of our series describing a

system design methodology

by Rosemary Rock-Evans

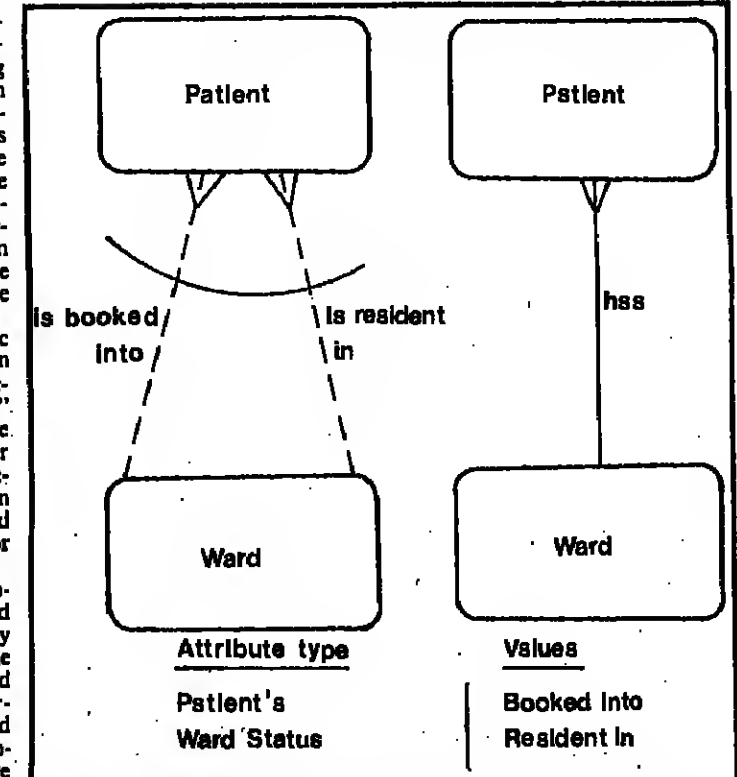


Figure 3. Replacing exclusive relationship types.

pital and Patient. The replacing of inclusive and exclusive relationship types from the model has several considerable benefits. It simplifies the model, it provides a very useful cross-checking method to ensure that all the events (and thus functions) have been covered, and it also shows where functions have perhaps not taken the different entity sub-types into account.

The use of functional hierarchies to determine entity sub-types is only part of the process normally employed to determine the attribute types. It is interesting to see, however, how the model and the functions tend to complement each

other; again providing a method of cross-checking to ensure that all events and functions have been covered and all relationship types discovered. It should not be a surprise that this occurs. Functions create relationship types, modify them, and delete them; and the entity model is only a static representation of all the dynamics of the systems which set up on it.

In the next article the results of functional analysis and entity analysis will be combined in the technique of access path analysis.

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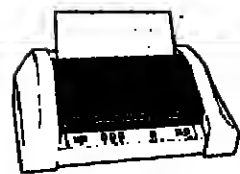
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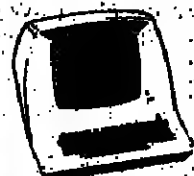
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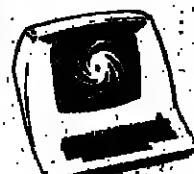
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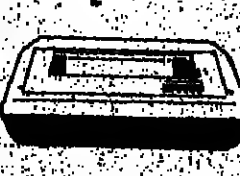
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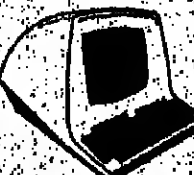
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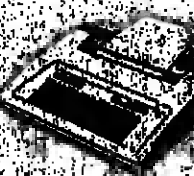
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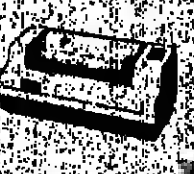
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Computers can create knowledge – and information too

— SAYS
SOFTWARE
CONSULTANT
ALAN
SUTCLIFFE

THE story so far: Donald Michie (Privateview, July 24 and October 28, 1980) asserts that a computer can create knowledge but not information. I maintain (Letters, September, 1980) that a computer can create information.

Professor Michie gives a lucid exposition of the accepted meaning of information, and create seems to have a clear meaning: cause something to come into existence which was not there before.

With the terms agreed we still differ, as I believe that I have given an example of a program which causes information to come into existence.

Michie thinks not, so let me outline some problems and paradoxes raised by his thesis.

A computer can liberate information already latent in an algorithm, as a blowlamp can thaw (not create) water from an iceberg, he says.

Problem 1. Can a finite algorithm contain an unlimited quantity of information?

Somewhat to his puzzlement, Pythagoras proved that $\sqrt{2}$ is

irrational: it is not the ratio n/m of any two integers. It follows that the decimal representation of $\sqrt{2}$ continues indefinitely and without ever falling into permanent cyclic repetition.

The well-known algorithm for computing the digits of $\sqrt{2}$ is finite and can be specified completely on a small piece of paper yet is capable of producing an unlimited number of digits, which are information.

Unlimited

Admittedly, it needs a blowlamp of unlimited size, that is a computer (electronic or human) with no storage limit since computing digit $n+1$ entails using all preceding n digits.

I contend that this computer and algorithm combination creates an unlimited amount of information. If they produce 1.4 as the first two digits of $\sqrt{2}$, I would prefer to say recreate.

If they are used to calculate the hundred thousand millionth digit

Donald Michie says a computer can create knowledge but not information. Software consultant Alan Sutcliffe disagrees — ha

says information CAN be created. Here he explains why... and Michie responds.

for the very first time there seems no doubt that this is an original creation.

There is an automata theory proposition which states that an algorithm + machine + score which are all finite can only generate a string of bits which must repeat eventually.

Such a system cannot write out the increasing sequence of integers without reaching one that it is too big for it to manage.

But my point is this: Donald Michie says the information is latent in the algorithm, not in the score or processor and a finite algorithm can generate unlimited information running on the right equipment.

Repetition

Problem 2: Does the ability to measure the information capacity of a source depend on cyclic repetition?

"Multiplying this by the repeating period of the output sequence (which must be finite, as is that of the pseudo-random number generator employed) gives an estimate of the music machine's total information content," we read.

Before we got a PDP-8 to generate pseudo-random numbers amongst other things 13 years ago, Peter Zinovlev at Electronic Music Studios employed a real

random number generator in the form of a tiny radioactive source with a Geiger-type counter looking at the problem.

Nuisance

The unrepeatability of this device could be a nuisance. If you hadn't made a recording of the output, there was no question of "Play it again, Sam!" as it was a genuine case of the lost chord.

That was not part of my music machine but could have been and that seems enough to put a spanner in the works of the "total information content" concept.

Problem 3: The relations between information content, algorithm complexity and musical interest (I will not say value or quality) are paradoxical.

Simple algorithms like random or repetition produce the dullest music and a more complicated algorithm is needed to make something more interesting.

That may give some random surprises and repetition, imposing some structure on the output.

The converse is not true and a complex algorithm may make dull music. All this is intuitively reasonable but this rough correlation does not extend to information content.

This is highest for random, lowest for repetition and somewhere between for more complex

structures, as shown in figure 1. Noise is richest in information, but low in interest.

This paradox is not necessarily a problem for Michie's thesis, though it does show a limitation of the textbook definition of information.

Problem 4: What are information structures?

Donald Michie seems to make a concession at the end of his second article. "A computer can create new information-structures. It cannot create information."

What an information-structure is and how it differs from just plain information has not been made clear to me. Can you really create one without the other?

Problem 5: If an algorithm or computer cannot create information, who or what can?

Information exists which did not before: ergo, it must have been created. How? My answer is in all sorts of ways: computers, people, our cat, genetic chemicals, the sun.

I'm not sure about the last, but evolution is based on the creation of new information in genes — mutations — as life is based on its replication. What is Donald Michie's answer?

First bit

If a computer cannot create information, as he says, then presumably neither can any other machine. Is it then a purely human



alan sutcliffe

accomplishment? Was there no information on earth before we evolved?

Creating the first bit of information: that would have been an event worth recording. Or perhaps information is just not created at all.

While you are pondering over that, you may like to think also about how information can be destroyed — if it can.

Problem 6. Can knowledge be created or exist without information being created or existing?

Donald Michie is clear that a computer can create knowledge. But I believe that every instance of knowledge must have its representation as information in order to exist.

There is no such thing as knowledge without information, any more than there is mind without brain although this is another case where the converse does not hold.

Whereof we know, thereof we must be able to speak and speaking entails the transmission of information.

I will not dispute with Donald Michie, our foremost knowledge engineer, whether a computer can create knowledge. A more useful discussion would be about the range of meanings we might attach to the words proving this proposition.

Sutcliffe is the principal of software company Systems House Ltd and vice-president of the British Computer Society with responsibility for specialist groups.

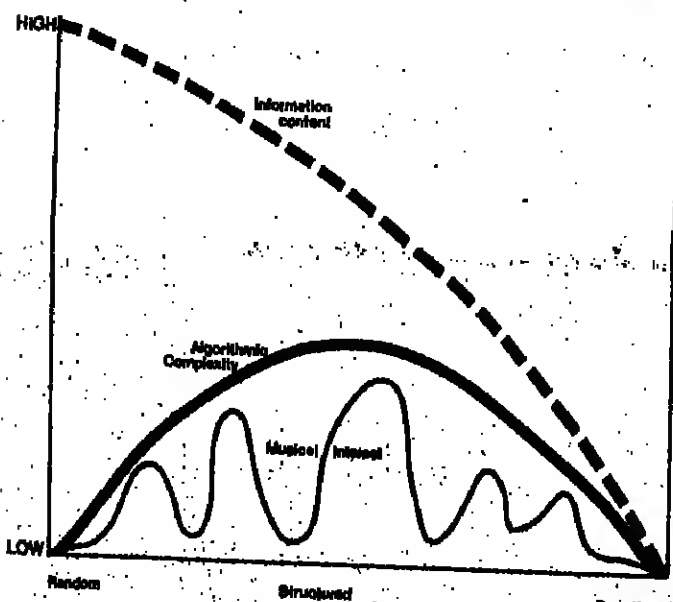


Figure 1

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I disagree, says Professor Michie

USING arguments which fall to address the words which I actually wrote, Alan Sutcliffe expresses the counter-view that a computer can create information. My words included the following foundation statement:

"I consider the information-content of a finite source. In the case that it is determinate, we identify this with the quantity of information contained by the total machine which the source is capable of generating."

I demonstrated how an expert-mental estimation can be made of the amount of information latent in such a source — for example, Alan Sutcliffe's music-generating program.

I likened a concept given by the Sutcliffe machine to applying a blowtorch to an iceberg. Just as some fraction of the total water-content of the iceberg is converted from frozen to liquid form, so by running the music machine we convert some fraction of its contained information from one form (implicit) to another (explicit).

Problems

Sutcliffe does not like this and believes that his program causes information to come into existence.

He prefers to think that prior to run time this information did not exist, even in implicit form. In support of his position, he poses a succession of problems.

Problem 1. Can a finite algorithm contain an unlimited quantity of information? Nothing at all had earlier been said about finite algorithms. My foundation statement refers to a finite source, which in the context of computation comprises a finite algorithm plus a finite machine plus a finite store.

Limited as we are to operating within the bounds of the observable universe, we lack the means of housing non-finite embodiments of any of these three. Sutcliffe's Problem 1 is thus beside the point. I have no objection to crediting an algorithm with infinite information-content.

Once it is paired with a (finite) computer so as to constitute an information-processor (source), the information which can be contained is no longer infinite.

Problem 2. Does the ability to measure the information capacity of a source depend on cyclic repetition?

Sutcliffe produces a set-up in which a radioactive source is enabled to feed a truly random number into the computer via a Geiger counter.

My foundation statement specified that the source be deterministic. The Geiger-driven machine is thus wholly irrelevant to the matter under discussion.

Problem 3 concerns the indeterminacy of messages. It is declared to be "not necessarily a problem for Michie's thesis".

Problem 4: What are information structures?

In my next Privateview some specimen information structures will be exhibited and an answer supplied to Sutcliffe's supplementary question: Can you really create information structures without creating information? The answer is "Yes".

Problem 5: If an algorithm or computer cannot create information, who or what can?

As was spelled out by the late Norbert Wiener, the answer is "No-one". Wiener linked Shannon's new theory to certain well-established concepts of physics, pointing out that information behaves like negative entropy.

Hence, within a closed system there cannot be a net creation of information any more than there can be a net reduction of entropy.

Our case, in which a net increase of information has arguably been engendered by the

growth and evolution of its biosphere, is an open system, fed by ceaseless input of energy from the sun.

Alan Sutcliffe has stumbled by overlooking this distinction and forgetting that real as opposed to ideal digital computers belong to the closed category.

Unthinkable

Problem 6. Can knowledge be created or exist without information being created or existing?

Knowledge cannot exist, per se, if it is created without information existing. But it can both exist and be created without information being created within the system.

A net increase in the information-content of a closed system is as unthinkable as would be a net increase in the water-content of an iceberg isolated from extraneous sources.

Basic similarities between the iceberg-blowtorch system and algorithm plus processor plus memory become evident from inspection of concrete cases.

The first aim of the committee was to establish necessary standards to be applied in a new sector in the CCH's bibliography concerning with compiling case studies.

Although case studies have long been used as an effective aid to management training, it is only since 1973 that the Case Clearing House for Great Britain and Ireland has been in existence. However, there was a distinct lack

of case studies relevant to the data processing trainee, until the National Computing Centre, with the help of government backing, stepped in. RON BROWN, education and training liaison manager at the NCC, describes the

NCC's progress so far, detailing the necessary standards to be applied in the sector of the Case Clearing House's bibliography concerning the computing profession, and suggesting that readers may be able to help the work.

A valuable aid to DP training

CASE studies are to the management trainee what jousts were to the aspiring knight errant and flight simulators are to the modern pilot. They provide an effective way of learning, not least through one's mistakes, without endangering life, limb or the carrying of profits.

Although, as a means of management training, case studies have been in general use for a long time, it is only as recently as 1973 that the Case Clearing House of Great Britain and Ireland was established to collect and distribute case studies. Today the CCH has over 7,000 master copies of such studies, and it distributes bibliographies and a regular bulletin of information about them.

However, it lacks relevant case studies to meet the needs of those involved in the training of computer staff, including systems analysts and programmers. As with all types of professional training, effective training of computing staff demands learner experience in a simulated work atmosphere.

Pioneered by the National Computing Centre in 1967, the Basic Systems Analysis Course included case study material which is still used in training courses. Among computer professionals, interest in case study methods of training has increased since then, to the extent that the new BEC/TEC syllabus for HNC/HNDs in computer studies require the integration of the method.

Practical

Many types of case study are applicable to computer staff training, but those case projects which can provide extensive experience in simulating the whole or part of the computerisation of a system are of the greatest practical value to the student. Their successful use depends upon the tutor fully understanding the detail and environment of the case.

In its role of researching and encouraging the development of new areas of computing, NCC gained government backing to establish a clearing facility to generate more widely used and improved case studies. Initial research by NCC soon revealed the need to make available a more extensive range of relevant and complete case studies, which would be readily identifiable and reasonably priced.

The differing needs of training courses and establishments were clarified by NCC's association in 1977 with Manchester Polytechnic's conference on the use and development of case studies for BEC/TEC HND/HNCs in computer studies.

Accessible

The conference confirmed the need for portable, relevant computing case projects — these were rare.

Following the Manchester Polytechnic conference, NCC established a representative editorial committee of case project experts, to assist with the development of new and existing studies. This was an important step forward in making practical DP case projects accessible to lecturers and course developers.

The first aim of the committee was to establish necessary standards to be applied in a new sector in the CCH's bibliography concerning with compiling case studies.

The committee's three-point plan to provide practical standards for the content and layout of case projects was defined. It stated that the standards should be readily understood and acceptable to the author; physically economical, thus ensuring a low cost product; and finally, sufficiently comprehensive to ensure that the user finds the case study easy to understand and to apply.

Following extensive tests and trial application of the first cases, the committee established five points for the standard: summary specification; scenario; tutor's guide; assignments; and suggested solutions.

The summary specification provides a contents list and details of learning objectives, a resumé of case, resources required, teaching and assessment consideration, and a course for which it is used or recommended.

Bibliography

Copies of summary specifications are assembled to make up the bibliography, thereby providing ample information to training staff seeking case studies.

Thus, information contained in the resumé provides the first level of classification/index, the second level being via the topics covered, as indicated by the author of a pre-printed topics list.

The basic case study is contained in the scenario, which would normally be handed out to the students to set the scene for the subsequent work. These will be available on request, as the inspection copy, providing a further level of effective scrutiny for potential users.

The existence of separate specific sections should ensure that the details of assignments and suggested solutions do not appear in the scenario. Some overlap may be justified, but full use should be made of the Tutor's Guide section to restrict the scenario to its allotted task.

Full details

Portability of a case project largely depends on the Tutor's Guide, with its overriding objective of enabling people other than the author to run the case successfully. Where necessary, it will contain further information on the scenario, particularly where this should not be made directly available to the trainee.

The guide should provide full details of methods and procedures involved in using the case, including the timescale, resources required, checklists and role playing briefs. This section of the case project should only be issued to the training staff and, therefore, numerous copies will not normally be required.

Assignments section contains a clear description of the practical work

Why users turn to a database management system

DURING the past decade, a vast amount of money has been spent by users, manufacturers and telecommunication administrations on the provision of teleprocessing access to computers.

By mid-year it is forecast that nearly a third of all IBM users will be using TP. The National Committee on Computer Networks has reported an actual and expected growth in communication-based systems.

The purpose behind all this investment is simply to create an access path from system user to computer. But what happens when the user reaches the system?

All too often he finds the information he wants to access in complex forms which are far from convenient for real time manipulation and which are far too rigid to be modified easily to his needs.

It is as if we spent millions of pounds constructing a six-lane highway to a city, only to place at

Practical

the city gates an impenetrable maze in which the traveller soon got hopelessly lost.

To capitalise on investment already made in basic computing and on the further TP investment, the user must make further investment in a mechanism to make the data in his system more accessible.

That mechanism is a database management system, DBMS, and it is upon choice of a DBMS and the critical factors influencing that choice, that this article serves to focus attention.

Data may be duplicated in several files and the complex mesh of inter-file and inter-record links necessary to exploit such files in a non-DBMS environment soon becomes totally beyond human control or comprehension.

In its simplest terms, a DBMS is a single logical construct designed to provide a data repository. How successful has the initial application of the DBMS proved to be? To nobody's surprise, users have found that DBMSs demand an investment of time, effort and money. They are often complex systems in their own right and users must be ready to go through a learning process before they get the full benefit from them.

It would not be an exaggeration to claim, on behalf of DBMS users, a high rate of success among those who have persevered in seeking tangible benefits.

The benefits they have achieved include reduced programming

by Nicholas Pollard

effort through greater ease of use, less data duplication, greater consistency of data and faster response to new user requirements.

These benefits are all of interest to a DP manager with demanding users and scarce resources of manpower.

Given that benefits are available to be won by the use of a DBMS, and that the IBM user has at least a range of choice, what criteria are likely to influence his selection?

To some extent these criteria mirror potential benefits. The DBMS must be easy to use, in terms of program development, database design and database maintenance.

Otherwise, the user will not



Author Nicholas Pollard is managing director of Applied Data Research, and has been involved in software products, including sales, support and marketing experience, for the past 10 years.

Before his present appointment in January 1980, Pollard was with CAP-PPP, first as UK sales manager and later as CAP software product marketing manager with additional responsibility for certain ADR products marketed under licence by CAP.

Before CAP-PPP, Pollard spent several years as Computer Technology product manager.

have enough staff to exploit the system. In particular, the individual application programmer must find a high degree of data and structure independence.

With this, he can ignore the physical layout of the data (the stored image) and need not change his programs when the database is amended by, say, adding a new data element.

It is important for the database administrator to express his database design and respond quickly to changing user needs. He should be able to add and delete data elements, add keys and express new data relationships without major design effort.

The most recently adopted approach to database is the inverted list approach as instanced by Adabas from Software AG, System 2000 from Intel and Datacom from ADR.

The major difference between these and other systems is that data access is via an external index, usually known as an inverted list. The physical organisation of the data can be kept to a simple flat file.

These two characteristics lend themselves well to the relational approach - after all, a "relation" is no more than a number of associated elements, that is, a record.

A great attraction of the relational approach is that it can be used to represent any other logical view of data, including the hierarchical or the network view.

From a practical point of view, an embedded-pointer system would suffer an unacceptable penalty because the route through the data is mapped out essentially within the data itself.

The major benefit of the inverted list approach to physical organisation is not just that many logical views of the data can be defined.

It is that they can be modified or increased more or less at will, without affecting the physical data or the application program not concerned with the new data elements.

Simplest

Clinching argument for the inverted list database approach is ease of understanding, as anyone who understands the concept of a sequential or flat file can master this approach.

Some of the most advanced concepts in system design still turn out to be the simplest. What are the problems with inverted list database design?

It is said sometimes that this design is best suited to sequential processing and it is true that systems like Datacom are extremely fast at sequential processing. However, the index is also well suited to random access and sometimes efficiency questions arise through claims that inverted list systems are capable of representing relational structures.

Stories are rife that IBM is delaying release of a relational database because of "performance problems".

To some extent, this speculation was confirmed by Dr Frank King of the IBM Palo Alto research centre in the course of a speech given at the IFIP Congress in Melbourne.

The current performance of IBM's relational DBMS (System R) was described as up to 50 times less efficient than a hierarchical system and up to 100 times less efficient than a DBMS embedded in an application system.

Dr King also cast doubt on the feasibility of providing bridgeware to help IMS users migrate to System R - the first time such doubts have been publicly expressed by an IBM spokesman.

Only time will tell whether such pessimism about System R is justified but if it is, the reason may be that IBM is seeking the ultimate solution to database problems.

This is the full relational model with all facilities envisaged in the theoretical work of E. F. Codd. Few knowledgeable database observers envisage implementation of a pure relational model this side of the 1990s.

However, the user has specific entry points to the data structures and the application programmer must "navigate" his way around the database. Using embedded pointers also means that database changes are still a problem.

Programmers have to concern themselves with data structure and the database administrator with the needs of the individual application program.

The logical view and the implementation strategy are entwined so closely that even minor changes to the database may require major physical rebuilds.

There are two well-known systems built upon the network approach. Total from Cullinane and IDMS from Cullinane. Like IMS, they are also organised physically around the embedded pointer. The network concept expresses more effectively the logical relationships between different data elements.

Unlike IMS, however, these systems do not tie the user to viewing data both physically and logically. They achieve a better level of structure independence by this approach.

Three models

To management, who must authorise acquisition of the DBMS, it is also important simply to be able to understand the issues involved in the choice.

Of all methods of representing data in a model, three are the most familiar and are the bases of the systems available to users. They are hierarchical, network and relational models.

In a hierarchical model, data is represented as a tree structure with data at higher levels depicted as "parent" data at lower levels. The network model views data as having a logical two-way relationship.

The relational model is much less rigid and allows any number of different views of the data to be taken. In the world of the physical database there are only two widely-used approaches.

First is the embedded pointer, where the link between one record and the next is contained within the record. Second is the inverted list, where an external data index is maintained.

Different products combine different logical views of the data with different physical treatment. For instance, IBM's IMS (or DL/I) takes a hierarchical view of the data and implements it via embedded pointers.

It also allows users to view the same physical data in several logical ways, imposing alternative hierarchies on the stored image. But in this case, data independence is imperilled severely.

Network concept

Programmers have to concern themselves with data structure and the database administrator with the needs of the individual application program.

The logical view and the implementation strategy are entwined so closely that even minor changes to the database may require major physical rebuilds.

There are two well-known systems built upon the network approach. Total from Cullinane and IDMS from Cullinane. Like IMS, they are also organised physically around the embedded pointer. The network concept expresses more effectively the logical relationships between different data elements.

Unlike IMS, however, these systems do not tie the user to viewing data both physically and logically. They achieve a better level of structure independence by this approach.

However, the user has specific entry points to the data structures and the application programmer must "navigate" his way around the database. Using embedded pointers also means that database changes are still a problem.

Programmers have to concern themselves with data structure and the database administrator with the needs of the individual application program.

The logical view and the implementation strategy are entwined so closely that even minor changes to the database may require major physical rebuilds.

Hundreds of software packages will provide numerical or "technical" assistance to help us make decisions. Few, if any, tackle the often more worrying personal and political aspects of those decisions. A team at Bath University's school of management has spent the last few years producing software to give just this sort of help.

TIM SMITH and COLIN EDEN, two members of the team, report.

SOMETIMES the decisions we, and others in our organisation, are called upon to make are complicated and messy. Often, besides involving difficult technical or financial problems, there are also delicate personal, political or highly subjective considerations.

There are hundreds of computer software packages designed to assist with the "technical" or numerical aspects of decisions, but we may look in vain for help from the computer with the more judgmental, and often most worrying, factors involved in a complex decision.

Over the past few years an interdisciplinary team brought together at the School of Management of the University of Bath has been developing software aimed at providing just this sort of help for decision makers.

Traditional uses for the computer have led people to see them only as giant "number-crunchers", restricted to working with those aspects of problems that are well-defined and readily quantifiable. Indeed, many applications packages reflect this constraint.

The consequence of this type of restriction is that one is often forced to define problems as what can be modelled by the software. This typically happens to such an extent that the decision maker becomes uninterested in the help that a computer model can provide, because the model created has driven

out those aspects of the problem which he regards as most important.

COPE (COgnitive Policy Evaluation) is a software package which enables users, who may be not be computer experts, to create, develop, and explore qualitative and subjective aspects of problems. The exploration may naturally lead to a quantitative computer model, but only after the decision maker has considered other aspects of the problem and decided that this will help.

No longer is a user forced to express the problem in dry, uninteresting and often misleading numbers, weights and rankings just because the model demands it. The basic contents of a Cope model are ideas, beliefs and assumptions and their relationship to one another expressed in the language of the decision maker.

Cope enables the decision maker to describe his views on an issue and to capture them in a computer model which can then be used as the basis for analysis, elaboration or sharing with others in the organisation.

The above emphasises the way in which Cope is used to help decision makers solve problems. It has also been effective in helping:

- Systems analysts form an effective communication medium between analysts and client, and analyst and programmer.
- A variety of teams in housing, community action, publishing, and charities to share their beliefs and ideas about strategy and long-range planning.
- Students as a part of an interactive programmed learning exercise.

"When necessity demands it - as during the Second World War when Britain was forced to drastically reduce its dependence on imported food - Governments proved quite able to organise rational and efficient use of open spaces... yet the same bureaucratic machinery has produced the urban wastelands that become commonplace... allotments contribute to Britain's food requirement... the concern of authorities for making use of open space declined with the absence of war pressure... 'cabbages in the Royal Crescent' are seen as detrimental to the future of Bath as a tourist centre... there is a greater concern for a higher 'Britain in Bloom' rating... no doubt the fall in the number of allotments is because public interest in gardening has declined... but there is also commercial pressure for the release of valuable urban sites" (extract from Bath Community newspaper Spark, August 4, 1978 - slightly modified).

Figure 1. Extract from a discussion about community land uses in Bath.

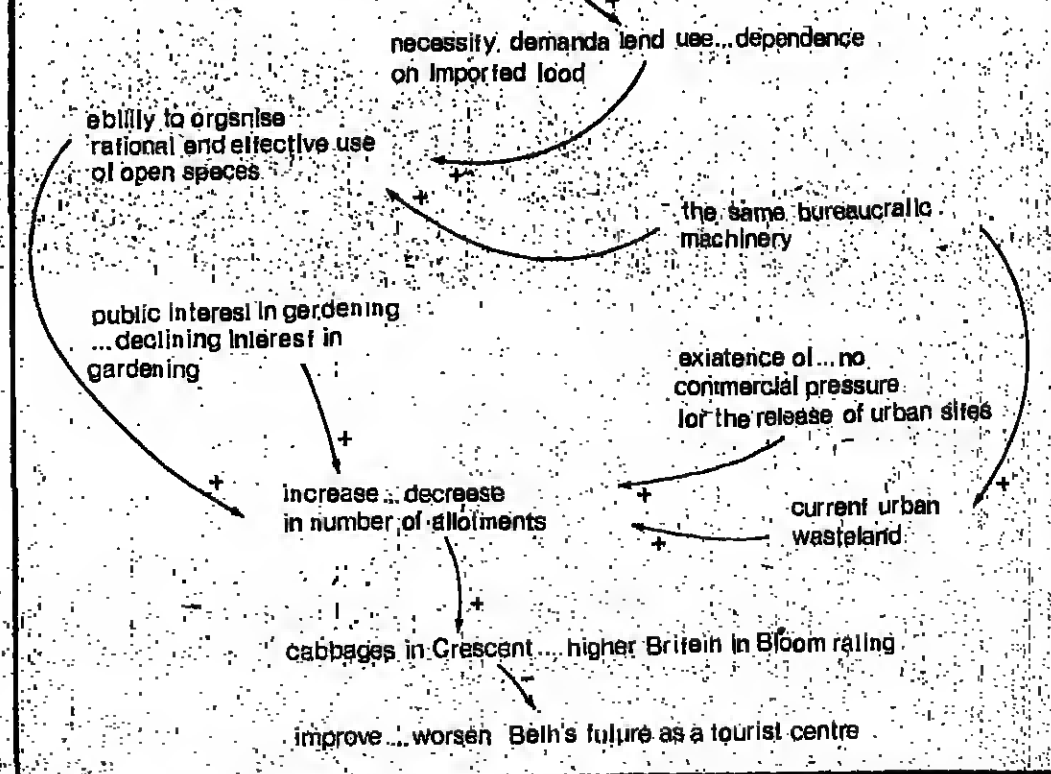


Figure 2. A cognitive map based on the arguments described in Figure 1. A plus sign indicates that the first part of one concept leads to the first part of the other concept. Thus "increase in the number of allotments" leads to "cabbages in Crescent" and conversely, "decrease in the number of allotments" leads to "higher Britain in Bloom rating".

A package that helps to cope with decisions

Individuals to conduct a sort of "life planning" exercise through self reflection and self learning.

● A person to develop and check the arguments he will use in a report or meeting.

● To record the minutes of a meeting in such a way that the ideas and points expressed are clearly related to one another, and immediately available during the meeting.

Behind Cope is an approach to assisting individuals or groups in organisations, which emphasises the need to listen and reflect each person's view on an issue.

We are often beguiled in this age of modern science, in which the computer industry is a spectacular example, into imagining that every problem has potentially a hard and fast answer, that once the "facts" are revealed all reasonable men must bow to an inevitable solution.

We tend to forget that individual judgement and interpretation of what the "facts" mean or even of what the "facts" are, become very significant aspects of any issue.

We equally tend to play down the importance of the role of each individual's own values and purposes in determining outcomes.

Thus the keynote of Cope is listening to the things that matter for an individual, and attempting to reflect them in the model.

Individual

Our experience suggests that in order to construct a model which a client will feel committed to, and use, careful attention to the detail of individuals' understanding of an issue is essential. A reasonably detailed and authentic picture of the issue as an individual or perhaps a group sees it is the starting point for work with Cope.

The software has been designed to pay attention to the concerns expressed above, and has attempted to make the user-machine interface as friendly and relevant as possible, without becoming gimmicky or trivial. An important contribution to the friendliness of the software was the evolution of Cope in direct response to users' needs, and the close interaction between the system designer, Jim Wiltshire, and the rest of the team.

Data entry is interactive via a keyboard terminal, and as there are very few format requirements, data can be typed straight in.

A set of routines then interpret and assemble the data into the appropriate format for the model.

Changes and checks on input can be entered at any time, and there is also an extensive and graded set of help messages to guide users through data entry, so only a very minimal training is required for a user to begin to build and use the model.

Current developments are aimed at making this process even simpler through the use of graphics screen and light pen, and a question and answer dialogue section for those users who prefer this way of entering data. Data manipulation and model simulation are similarly designed to respect individual needs.

No concessions

Comments are either one or three letter mnemonics, which may either be used singly, or for more experienced users can be combined to perform the more complex analytical tasks available in the model.

Cope has been a "programmer's nightmare", since we have made no concessions to programming ease. All the developments have stemmed from comments (nice and nasty) made by users.

The heart of Cope is the network of concepts and their effects on each other derived from a "cognitive map", which is a picture of the problem as seen by an individual. In many ways it is similar in form to flow charts or network diagrams - to a Cope map, the nodes are the concepts expressed in the words and phrases of the individual concerned.

In the same way that it is possible to trace through a flow chart, Cope explores the network of concepts and can for example highlight the consequences of a particular policy or change in other concepts. The user can thus gradually explore the possible consequences of his actions and policies in a more thorough and systematic way, than by just "doing it in his head".

Cope is a way of simply dumping ideas out of your head, and by freeing your mind in this way you can often look at those ideas more clearly and carefully. Like doing a long division sum, there comes a point when you can't keep it all in your head and you turn to a pencil and paper for help.

'Pencil'

For more complex problems Cope acts in a similar way. As one of our clients recently put it (the head of research of an international company): "I viewed Cope... as a pencil allowing me to draw out my thoughts, thereby allowing them [concepts] to come from within my thoughts, some of which I had been unable to see clearly before."

Cope has now been used in a variety of situations. Typically, users either work with the model at the university, or have continuous access via a dial-up line. The latter facility means that use of Cope is now a relatively cheap and simple operation, and does not require expensive hardware.

For example, it has been used in the publishing industry to help an editorial team re-think their policy, in a local government housing department to assist senior officers to think through housing policy issues, in a national charity to help generate new ideas for fund-raising, with a local community group to assist them in planning their future developments, and in the furniture industry to examine issues around machine purchases.

In each case, the flexibility of Cope has enabled us to build models which adequately represent the issues as the participants viewed them, and thus encouraged

the exploration of the issue.

Cope, then, is an attempt to put into practice two principles about computing, to which, with the growth of personal computing, all of us concerned with computer modelling must pay special attention:

1. You should not have to know anything about computers to be able to use them.

2. Computer models must move away from the more technical aspects that they have tackled to date, and begin to explore less well-defined and more judgmental aspects of problems.

In Cope we have begun to build both an approach to modelling and

the software to go with it, to make computer power available to individuals and to enable them to get to grips with some of those less tidy aspects of their problems. At a time when personal computing is expanding rapidly and computer power is available to an even wider and non-technical audience, it seems important to think more about the kinds of models that will be useful to users.

Note: The Cope software package has recently been released for purchase by industry, commerce and teaching establishments. It is written in Fortran IV and can be transferred in most machines with a minimum of modification.

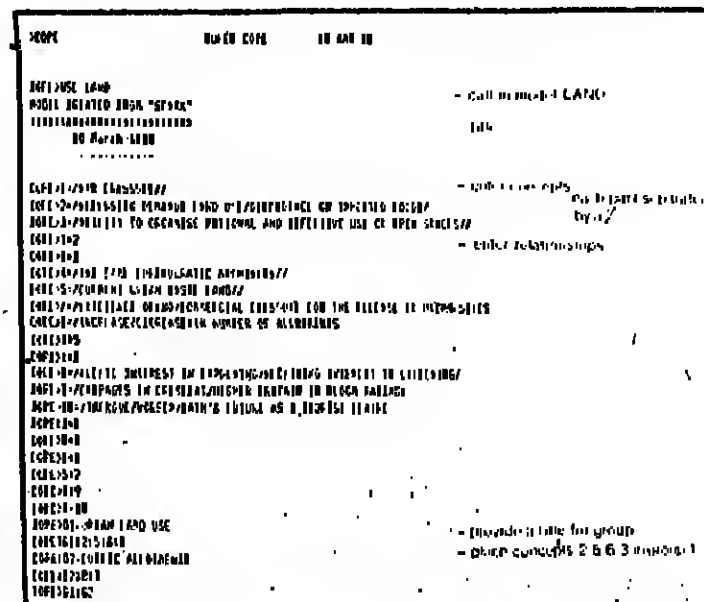


Figure 3. Illustration of the data entry process for a simple model.

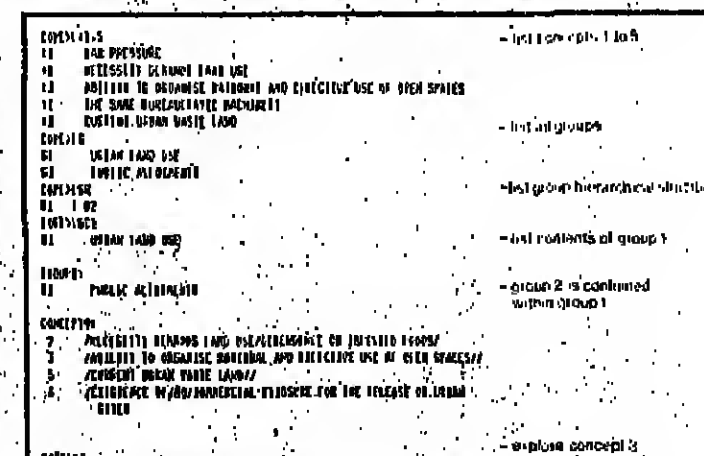


Figure 4. Model exploration, showing a typical way in which a model might be explored: using the group structure to identify areas of interest, then focusing in on particular concepts and their consequences.

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PRODUCT NEWS INTERNATIONAL

Versatile camera system

DEC-based Arrow Computer Systems has introduced a solid state computerised video camera system which acquires and stores data under the control of a DEC PDP-11.

Designated the MIP 3/V, the apparatus is the latest in the range of micro-based input processing systems from Computer Design and Application Inc and is designed for use in process control, instrumentation and engineering.

The MIP 3/V comprises high speed micro-controlled input processor board, a 16K-word dual port memory board and 128/128 x 8 bit per pixel solid state camera equipped with a 25mm, f1.4 lens.

Priced at £4,320 and deliverable within 45 days, the system may be used for continuous data acquisition or perform real time integration processing.

Arrow Computer Services Ltd (CW), Rosemount Tower, Stafford Road, Wellington, Surrey SM6 8RW.



Arrow Computer Systems' MIP 3/V video system is designed to offer a wide range of applications in process control, instrumentation and engineering. There is an additional bonus for the OEM user who can apply custom firmware to give him or her the facility to take full advantage of the MIP-3V's high speed processing potential.

Full-colour display terminal for military applications

AYDIN Controls has introduced a new full-colour graphic dual display terminal designed to meet "Tempest" requirements for electromagnetic-interference suppression in military and allied high-security applications.

Designated Model 5804, the new system meets the reduced requirements of the NACSEM 5100 specification and incorporates two cathode-ray-tube displays according to customer specifications.

Both full-colour graphic displays and monochromatic alphanumeric displays are available to form the combination best suited to users' needs.

The new dual-display system allows users to view graphic command and control signals in conjunction with detailed alphanumeric interrogations or alongside another colour graphic display.

Incorporating an Aydin 5216 display computer, the system is

fully modular; "off-the-shelf" units can be supplied to meet customer needs, and the terminal has both editing and full operator-control facilities.

The 5083 display terminal interfaces to a host computer via a customer-supplied "Tempest" qualified serial interface and serial data are passed to a 16-bit microprocessor for processing via customer-supplied software.

Display instructions are stored in a program memory for processing by a display generator.

In a standard configuration, the memory stores graphics presentations in five 512 x 768-point refresh memories. Configurations of up to 1024 x 1024 x 16-bits are available.

Refresh memory data from the display generator is interpreted by a video-driver look-up table providing composite video information to a high-resolution 19-inch red/green/blue colour monitor.

The display generator also provides an alphanumeric generator to drive a 14-inch high-resolution monochrome monitor.

Full text-editing capability is provided by an alphanumeric channel controlled by a keyboard and a 90-key function keyboard is also provided for user-defined applications.

A "joystick" is incorporated for alphanumeric cursor movement and either graphic cursor movements or graphic drawing.

Aydin Controls/Vector - UK (CW), Andre House, Salisbury Square, Hatfield, Hertfordshire AL9 5BH.

Enhanced floppy disc launch

ZYGAL Dynamics announces enhanced versions of its MiniMate and DataMate floppy disc storage units. DataMate II and MiniMate II being improved RS232 compatible mini floppy store and edit terminals.

The innovations extend capacity and capability of Zygals existing series at no additional cost.

Both existing units provide 163K storage as standard and can contain up to 1280 addressable records of 128 characters with optional storage capacities of 328K, the most available in any mini floppy terminal, the makers claim.

DataMate II adds powerful editing capability to non-intelligent terminals without the need for special program discs.

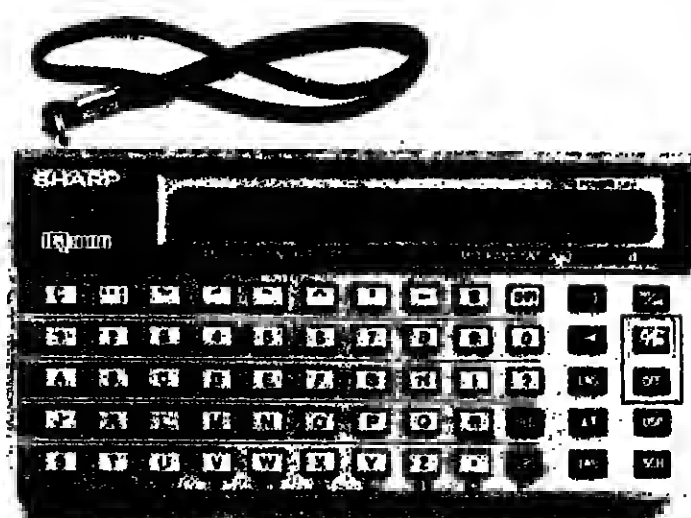
MiniMate II complements intelligent terminals by providing a character edit mode for editing by character.

A new global search and replace feature is provided on the DataMate II which allows the user to search a complete file for a word or statement.

Two additional search modes allow the first or each occurrence of a variable to be found for listing. MiniMate II offers a simple search mode that finds the first occurrence in a file.

Both units have store and forward capabilities, communicating in batch or line-at-a-time mode at switch selectable rates from 110 to 9600 baud.

Zygag Dynamics Ltd (CW), Zygag House, Telford Road, Oxon OX6 0XB.



THREE Business aids have been introduced by Sharp Electronics. They are the IQ100 translator, the EL6200 calculator and the PC1211 programmable calculator.

The translator (pictured above) is about the same size as a calculator, and translates English, German, French, Spanish and Japanese. The calculator incorporates a clock/calendar, four key memory and alarm. The pocket computer uses Base language and has a memory capacity of 1424 steps and 26 separate memories.

Sharp Electronics (UK) (CW), Sharp House, Thorp Road, Manchester, M10 9BE.

Lab power supplies

A SERIES of laboratory power supplies is available from Powerline. Called the Lab Series, it comprises single, two, three and four output models.

The single output models (there are five) have separate current and voltage meters, and LED mode indication. The two and four output models have separate meters for the fully floating isolated outputs, switched to read voltage or current. The three output model has a meter to monitor its output. It has two rails of 0-20 Volts at .5

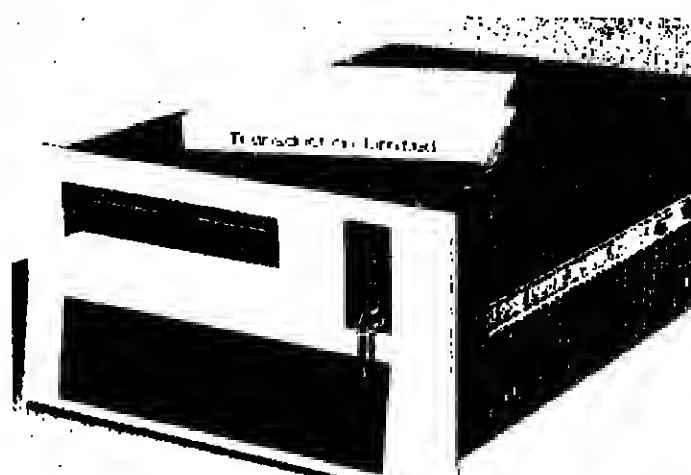
LSI-11 and PDP-11 families converge

AN ENCLOSURE which converges families of DEC LSI-11 and PDP-11 minicomputers has been introduced by Transduction of Canada.

Called the Superblue/11, it has an optional dual purpose bus converter kit (Q-bus to Unibus or Unibus to Q-bus) and dual drive DECtape II cartridge assembly. Switching power supplies provide 50A at +5VDC, 6A at +12VDC, 1A at -12VDC, 6A at +15VDC and 1A at -15VDC to service both LSI-11 and PDP-11

CPU, memories and controllers. The enclosure's front panel lighted push-button controls include Halt switch, Run Switch and Line Time Clock switch, with printed circuit board circuitry connected via ribbon cable to the LSI-11 backplane assembly. The control printed circuit board also has an AC power-up sequencing circuit and key-lock DC power on/off switch in lock out front panel controls for security.

The basic model costs \$2,650 or \$7,000 with all options installed. Transduction Ltd (CW), 1645-11 Sismet Rd, Mississauga, Canada L4W 1Z3.



The Superblue/11 minicomputer from Transduction

Colour hard copy

A FAMILY of colour hard copy output units is available from Sintrom Electronics. The system, called Videoprint, captures the video signal before it is displayed, transforming it into photographic media. It is claimed that in doing this it eliminates off-the-screen photography problems such as distortion, loss of colour fidelity and absence of consistency.

Inputs to the unit can be either RGB signals meeting the RS-170 standard, or PAL video signals. The Videoprint 3000 system is designed to work with personal computers and low graphics display systems. It costs from £1,500 to £2,100. The Videoprint 5000 system, for use with raster graphic systems costs from £3,100 to £3,600. Sintrom Electronics, 14 Arkwright Road, Reading, Berkshire.

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Mini-Printer with market appeal

THE Mini-Printer introduced by Digitronix is a compact 32-column printer which the company claims to be the lowest-priced universal printer available, retailing at £195.

The Mini-Printer accepts conventional Ascii inputs at RS232, TTL and 20 mA current loop levels, at seven baud rates from 110 to 4800.

Shake-up for WP industry

● From front page another. Up to four workstations can share a printer.

The Series 35 can accept microcassettes from the Typecorder, as can Sony's existing dictating machines when the Typecorder is being used for voice.

It is the portable Typecorder which can be carried to a briefcase, which Sony US vice-president for office products Bob Meridian describes himself as "most excited about".

It looks remarkably like the hypothetical Dynabook which was thought up at Xerox's Palo Alto Research Centre in the early 70s, although that was to have half-page screen rather than a single-line.

The technology for such a thin screen does not yet exist, but the idea of a portable "information resource" is still highly regarded.

The Microwriter (CW, November 13, 1980) now costs £465 and has attracted quite a following in the UK. Its chord keyboard is intended to be easy to use but the advantage of being firmly

It can interface with almost any microprocessor-based machine and supplements these user-selectable options by also accepting data on a parallel port.

An electro-sensitive mechanism, the printing unit employs the 64-character Ascii font at 64 characters/sec on to aluminium paper rolls 59 mm wide.

The unit operates quietly and incorporates several features, including double-width character and back spacing. On automatic test mode, it will print out a sample character set.

Made for the professional market, the unit is built to high standards throughout and housed in a 277 x 138 x 70 mm rugged steel case.

Mains power is used but there is provision for low voltage DC input, primarily for applications where other Digitronix equipment is interfaced.

A versatile instrument, the Mini-Printer incorporates microprocessor-based architecture which facilitates reprogramming for special applications.

The print font can be changed and, besides alphanumeric units, the output can be converted to create graphic dot patterns, representing analogue expressions of measured parameters, for example.

The Mini-Printer is a general purpose printer usable throughout the communications, control and data logging fields.

Because of low cost and versatility, it should find application in diverse areas, including scientific research and point-of-sale terminals.

Digitronix Ltd (CW), 11 Burners Lane, Kils Farm Industrial Estate, Milton Keynes.

Adjustable modem housings

A RANGE of adjustable modem housings has been introduced by Data Efficiency. The units, made of sheet steel, are available in three sizes: small, 45 inches high; medium, 61 inches high; and tall, 77 inches high. Each has a 24 inch base.

All units may be supplied with either fixed or roll-out shelves which can be adjusted to accommodate varying numbers and sizes

of modems. An optional right hand half door is available.

Electricity are housed in the base of the unit with the isolator to the rear centre. A six switched socket for the modems is standard, but an optional six switched socket is available for further capacity. Two sockets for use by maintenance engineers are positioned at the base of the housing.

Prices start from about £300.

Double-sided

A DOUBLE-SIDED 5.25 inch flexible disc drive, designed for OEMs, has been announced by Control Data.

Called the CDC 9409, it features full industry compatibility and unformatted data storage capacities of 218.8K bytes (single density) or 437.5K bytes (double density). The unit is designed for use in applications such as key entry, point-of-sale and data collection, and with word processing small business and personal computer systems.

Head positioning is accomplished by a band stopper mechanism. The unit does not require electrical adjustments or preventive maintenance during its estimated five-year service life.

It costs \$225 in large quantities. Control Data (CW), Control Data House, 179/199 Shaftesbury Avenue, London WC2H 8AR. Tel: (01-240) 3440.

Hotel accounting system

A FREE-STANDING program-mable guest accounting system is now available from NCR. Called the NCR 2251, it is claimed to simplify posting procedures, produce easy-to-read guest accounts and enforce strict transaction control in hotels of 50-200 bedrooms.

This electronic model replaces the electro-mechanical NCR 42. It occupies the same desk space and uses the same guest folio forms.

The system has a non-volatile memory and its printing capabilities include a 40-column single dot matrix printer for validation and journal printing, and a 90-column matrix printer for the guest's folios.

The keyboard comprises 10 captioned fixed function keys, including three receptionist keys and 22 fully programmable keys. Any two keys can have up to 10 distribution totals and may be either debit/debitment or settlement keys. VAT and service charges may be auto-

matically calculated as an option. Its costs £3,450 plus program charges.

NCR (CW), 206 Marylebone Road, London NW1 6LY. Tel: (01-388) 8248.

Portable micros

A MICROCOMPUTER based on the 280 microprocessor has been introduced by Portable Microsystems. Called the DTC 80-2, it comes in two versions. The DTC 80-2 is supplied with a 2K system memory, 8K basic ROM, full graphics in ROM, and a solid state query keyboard. The model is designed around the Nascom 2 microcomputer.

The DTC 80-1 starts at £295 + VAT, and the DTC 80-2 starts at £395 + VAT.

Portable Microsystems (CW), 18 Market Place, Breckley, Northants NN15 5NJ. Tel: (0280) 702017.

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ON 01-935 0671 (24 hour answering service)
OR 021-420 1574 (evenings and weekends).

For the Northern position contact PAUL PEARCE
ON 061-833 0427 (24 hour answering service)
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Guaranteed Growth

The increase in business now concluded for 1981 and beyond, is in stark contrast to the lack of growth currently being experienced by some areas of the computer services industry. The immediate result is that the number of professional staff will be substantially increased, since the new business will provide on-going project work for successful candidates.

Career Prospects

In view of the growth factor and the way in which our clients assign staff to project work, there is no doubt that there will be progressively more room for extremely senior consultancy and project management positions as time passes. Additionally, our clients approach to project control and system design is entirely modern and exposure to these methodologies is certain to enhance and increase individual professional capabilities.

Salaries

£10,500-£13,500 range, although a few more senior positions are available. Naturally, additional benefits such as a pension scheme, free BUPA, interest free season ticket loans etc also apply.

Location

The Company H.Q. is in the West End of London, so although most appointees may be working on site in the N.W. Home Counties for most of the time all candidates must be prepared to work in London. Full relocation expenses will be available if necessary.

Systems Analysts

These positions equate more readily to "Senior Analysts" positions in general and would therefore be suitable either for individuals already at Senior Analyst level looking for a move to consultancy work or for individuals who feel they are ready for promotion.

- Essential expertise must be thorough experience of establishing and defining user requirements.
- First-class communicative skills, both oral and written, will naturally be expected from all candidates.
- Knowledge of modern analytical methods, such as data analysis, would be a major asset although not a pre-requisite.
- Machine and software backgrounds are not relevant at this stage but experience of on-line systems is absolutely essential — preferably for large multi-user and multi-site systems.

Systems Designers

(incl. Comms & Software)

A broad range of skill requirements exists within various design teams, providing opportunities both for designers with a leaning towards software and for Analyst/Programmers who have not moved into pure analysis roles.

The technical areas of particular interest are:

- Communications Systems Design — including message switching, voice network, traffic pattern and work load pattern establishment etc.
- Software Design and Programming — development work on both operating systems and communications interfaces.
- On-line Systems Design — experience of man/machine interfacing and terminal based systems is essential.
- Database and DBMS Design — knowledge of how a vast amount of information can be structured, processed and distributed.

Contact: Andy Wright or Mike Creamer

Computer Operations Supervisor and Senior Computer Operators

The British Council works overseas in about 80 countries and is engaged in a wide variety of educational and cultural activities. Our ICL 2950 is currently being operated under contract but we are phasing in our own staff. We are looking for a Computer Operations Supervisor and two Senior Computer Operators to work in the ICL building at Putney, where our computer is housed, on our batch processing and on-line applications which run under DME and GEORGE 2.

The Computer Operations Supervisor will have responsibility for controlling day-to-day operations and supervising Council staff in the computer room and media library. Duties will include technical work, liaison with Council departments in general, and with ICL, responsibility for ordering supplies of computer stationery, tapes and discs, liaison with engineering services, maintaining control facilities, and providing holiday and sick leave cover. Applicants should have a good general education and at least two years' experience in computer operations including GEORGE 2.

Applicants must have at least two years' experience in computer operations and the supervision of staff. Knowledge of the ICL 2950 operating under DME, communications or systems software would be an advantage.

For further details and an application form, to be returned by 30 January 1981, telephone or write quoting DP/1 to:

Staff Recruitment Department,
THE BRITISH COUNCIL

10 Spring Gardens, London SW1A 2BN. Tel: 01-930 8456 ext 2531 or 2544.

advantage. Starting salary is £7956 rising to £9571. 22 days annual leave plus 2 1/2 privilege days. Non-contributory pension scheme.

The Senior Computer Operators (2 posts) will act as shift leaders, each shift consisting of one senior and one junior operator. The senior operator will be responsible for running the work of the shift and will share operating duties with the junior operator including controlling the 2950 through the VDU console, loading computer peripherals and general maintenance of the computer hardware and software. Applicants should have a good general education and previous experience as a computer operator. They should be capable of working under minimum supervision and should be good at dealing with all levels of staff. Experience of ICL software and hardware, knowledge of GEORGE 2 or communications facilities would be an advantage. Applicants should be physically fit. Computer operators normally work a Monday to Friday 8-shift system (0800-1600 and 1200-2000 hours) alternating shifts weekly. Starting salary is £5916 at age 20 or over, rising to £7751. Proficiency payments are payable following one year's satisfactory performance in the post. 20 days annual leave plus 2 1/2 privilege days. Non-contributory pension scheme.

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NEEDS First class salesman 25-35 years of age. Preferably able to sell to communications design engineers. Will consider outstandingly successful commercial systems hardware salesman.

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£5 NEGOTIABLE BASED U.K. WIDE

COMPANY OEM market leader. Dynamic growth — excellent 'A's', exciting new products. Advancement prospects unlimited.

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R26 BUREAU SYSTEMS SALESMEN
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COMPANY Bureau Systems, a leading manufacturer of office equipment.

NEEDS First class salesman 25-35 years of age. Preferably able to sell to communications design engineers. Will consider outstandingly successful commercial systems hardware salesman.

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COMPANY Young, ambitious, growing company with £100,000 p.a. turnover and expanding systems.

NEEDS Sales Director/Manager. Excellent for experienced salesperson. Will be responsible for overall sales and marketing strategy. Growth opportunity — 'first class' only.

R28 INSTALLATION SUPERVISOR
Circs £15k, on quota LONDON, MIDLANDS, NORTH

COMPANY Growing company with £100,000 p.a. turnover and expanding systems.

NEEDS Installation Supervisor. Will be responsible for overall installation and maintenance of computer systems.

DEPARTMENT OF FINANCE COMPUTER SHIFT LEADER

Grade TS/4
Salary £5,178-£6,537 plus 14% shift allowance

The Council currently operates an I.C.L. 1802T computer running under GEORGE 2+ with several on-line applications. A Honeywell L54/OPS 2 is due for delivery in 1981 as a replacement for the 1802T.

The successful applicant will be expected to play a substantial role in the transfer of work from the present equipment to Honeywell installation and a knowledge of the G.C.O.S. operating system is desirable.

Applicants must have at least two years' operating experience and be capable of accepting high levels of responsibility during the alternating shifts.

Application forms available from the Chief Personnel Officer, Civic Centre, Millgate, Wigan. Tel: Wigan 44981, ext. 43. Closing date: January 23, 1981.

Metropolitan Borough of **WIGAN**

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CROYDON
urgently required 2 Operators to work on a PDP11. Previous experience would be advantageous but not essential. The company, a well-known bank, offers an excellent benefits package including mortgage facilities.

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Applications from and further details contact Mrs. P. J. Taylor, Personnel Manager, Polytechnic of Central London, 100 Whitechapel Road, London E1 1BB. Tel: 01-950 5525 ext. 257.

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(3947)

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Applicants should send curriculum vitae to the Personnel Office, 2 Rodney Street, Liverpool L1 2UA. Tel: 708 8820 Ext. 43.

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Applicants must have a minimum of 2 years' Cobol experience. Knowledge of systems analysis, RPG II, JCL and computer operations would be added advantages.

Applicants should send curriculum vitae to the Personnel Manager, Charles of the Ritz Ltd, Victoria Road, Burgess Hall, W. Sussex, or telephone Burgess Hall (04446) 6988 for an application form.

Relocation expenses will be paid where applicable.

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Our clients have asked for a final short list of candidates before the end of January so contact us now via the telephone (24-hour answering service) or write to us immediately to arrange an initial interview.

REF: CW/3/81

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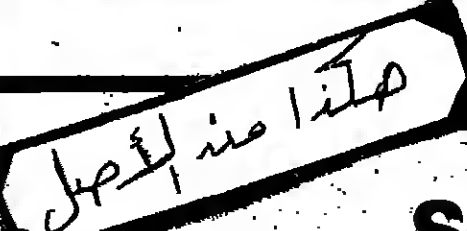
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- ★ 4 or more years in technical D.P.
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COBOL CHESHIRE Programmers (min. 2 yrs.), Analysts, Designers and Team Leaders with COBOL experience required for major new projects being undertaken by Northern branch of leading British Software House. Applications include order processing and pension management funds. Relocation offered where appropriate. £8.5-10K	FINANCIAL SYSTEMS Consultants, Analysts and Programmers with minimum 2 years' practical experience in financial/commercial systems - programming involvement essential - urgently required to meet new year expansion plans of leading Financial Systems House. Driving licence necessary; excellent promotion prospects. to £13K
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ICL Designers/Implementors with solid real-time, on-line experience on large mainframes (up to ICL 2880+), preferably with some networking/communications experience, required for implementation of major command and control systems - base in NW London. £10-13.5K	CONSULTANTS Senior Consultants and Managers with wide applications knowledge and experience in client liaison, proposal writing, interpretation of tender documents etc. required for London office of international Systems Group. to £14K	MICROS BERKS Software Engineers (On-Group/Endor) with in-depth knowledge of the application of real-time operating systems using microprocessors in environmental controls. Location in Berkshire. to £12K
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REAL TIME MINIS Consultants, Designers, Analysts and Programmers with real-time, on-line experience on large mainframes (up to ICL 2880+), preferably with some networking/communications experience, required for implementation of major command and control systems - base in NW London. £10-13.5K	MILITARY COMMS Analyst/Programmers with minimum 2 years' practical experience in financial/commercial systems - programming involvement essential - urgently required to meet new year expansion plans of leading Financial Systems House. Driving licence necessary; excellent promotion prospects. to £13K
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COMPUTER OPERATOR

Up to £6,477 + 14% Shift Allowance.



This appointment offers considerable scope for career advancement because our policy is to value good ideas from any member of our young, dynamic team. As a member of that team you would be based at the Computer Centre at Bridgend, Mid Glamorgan.

We are seeking an experienced Computer Operator with good

operational knowledge of ICL Operating Systems, preferably George 3, and ideally with control operation of a terminal network.

The mainframe is based upon "twin" ICL 2960 machines and associated peripherals which it is planned to "dual" during 1981. The equipment services a large terminal network throughout Wales.



Further particulars and application form are available from the Assistant Personnel Officer, Welsh Water Authority, Cambrian Way, Brecon, Powys LD3 7HP. Telephone Brecon (0874) 3181.

WELSH WATER AUTHORITY
AWDURDOD DWR CYMRU

When enquiring please quote reference 455. Closing date 23rd January 1981.

COMPUTER STANDARDS SUPERVISOR Oman

Petroleum Development Oman is now a major oil company, producing and exporting 300,000 barrels of crude oil per day with a staff of 3,000.

A vacancy exists now for a Standards Supervisor to provide a complete set of new computer operating and programming standards for the Company. You should have good experience in the development of computing standards and be able to work effectively with all sections of the computer centre and user departments.

P.D.O. offers a short service contract which, initially at least, will be on bechelor status with an excellent remuneration package including free accommodation and medical care.

Please apply with details of your qualifications and experience to: Shell International Petroleum Company Limited (C6) PBEL/51, Shell Centre, London, SE1 7NA.

THE UNIVERSITY OF ADELAIDE invites applications for appointment as a LECTURER IN COMPUTER SCIENCE

Candidates should have a higher degree in Computing Science and show evidence of interest and capability in research and teaching and be prepared to undertake supervision of research students.

For teaching purposes, the University is equipped with 3 DEC VAX computers and has a CDC CYBER 173 for research work. The Department has a PDP 11/40 for research purposes.

SALARY SCALE within the range \$A17,739.47 - \$A25,303 with superannuation.

FURTHER INFORMATION: A potential candidate should seek from the Registrar of the University the following documents:

(i) General Conditions of Appointment, which includes particulars of hours, superannuation, removal expenses, mobility and other leave; and

(ii) A copy of the University's policy on research, which includes particulars of research grants and special support for research.

The University will gladly supply any further information required on request to the Registrar.

APPLICATIONS in duplicate should be sent to the Registrar, The University of Adelaide, G.P.O. Box 468, Adelaide, South Australia 5001. Closing date 15 February 1981.

SALES MANAGER COMPUTER EQUIPMENT

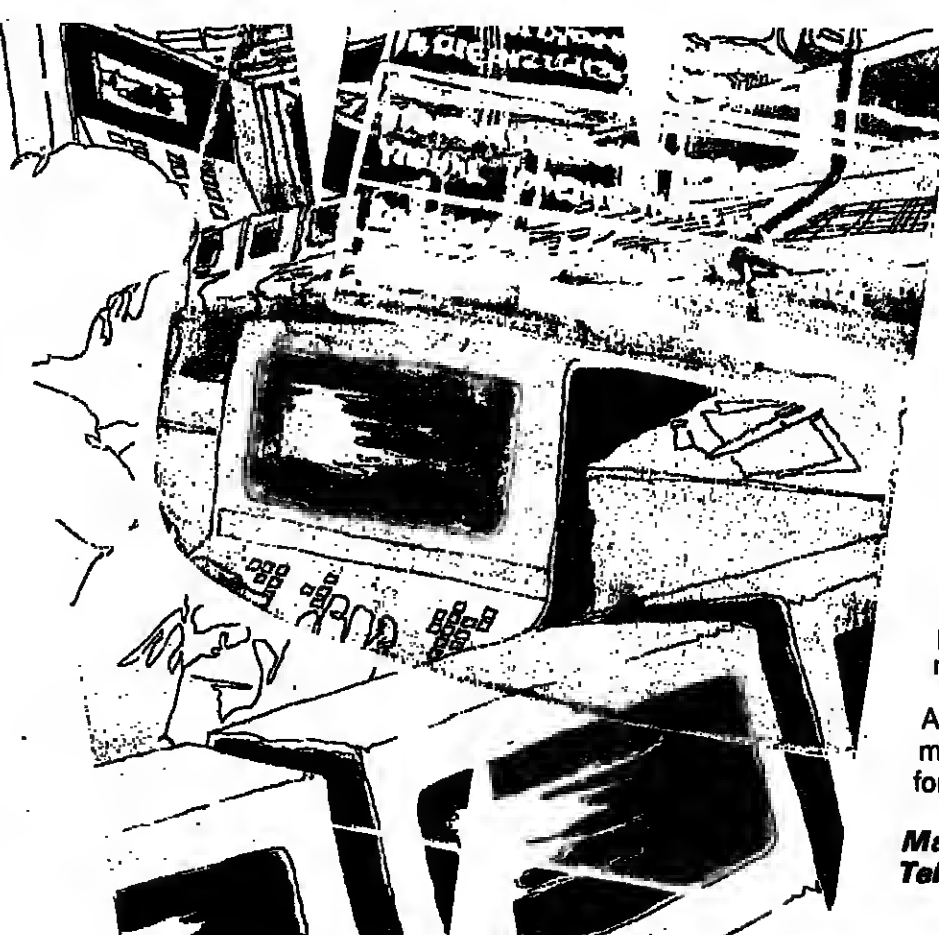
Are you an experienced salesman or woman with the ability to build a direct sales operation from scratch? Do you have an appreciation of microcomputers, printers, terminals and disk and Winchester disk drives, together with a knowledge of COBOL, BASIC or FORTRAN?

Then we would like to hear from you. We are the UK arm of an established international company, importing a range of US-manufactured computer equipment and peripherals, and we need a self-starter aged between 30 and 35 to spearhead further penetration of the UK computer market.

In return we offer an attractive, negotiable salary package and all the benefits you would expect from a growing and expanding organisation. If you feel you could meet our needs, write with brief details of career and experience to Box 112.

MANAGEMENT & EXECUTIVE SELECTION

telephone 01-637 9611



Go west for new name success

OEM DISPLAY TERMINAL SALES. BASED WEST OF LONDON

To £18K + 2-litre Automatic Car

The leading established international manufacturer of Display Terminals has asked us to identify a new business Sales Manager for West London and the West and North of England.

This is a new position in a well-developed region selling the complete range of display terminals principally to large OEMs and will require a proven track record in the Display Terminal market and ability to negotiate at Board level.

As well as a good basic salary, the commission plan is geared to motivate the successful sales manager to maximum financial reward for maximum effort.

Make a new name for yourself in Display Terminals — Telephone Ruth Herman on 01-637 9611.

Suite 201/6 Albany House 324 Regent Street London W1R 5AA 01-637 9611

MANAGEMENT & EXECUTIVE SELECTION

Look Where You Can Go With REAL TIME MINI

Beds. (the county, that is), Dorset, Herts, London, Surrey, Wilts. And most of the out-of-town employers/users, software houses, computer manufacturers alike — would be happy to cough up relocation expenses, as necessary.

For whom? For anyone with two years' + experience (any level) in Real Time Mini or Micro. Especially SOFTWARE ENGINEERS, SYSTEMS PROGRAMMERS, PROGRAMMERS, PROJECT LEADERS/MANAGERS, LECTURERS (Micro only), TECHNICAL AUTHORS and PROJECT ENGINEERS (Hardware and Software). Languages: Coral, Algol, Pascal, Assembly-Level.

Systems: Any Real Time Mini/Micro, but experience on DEC, RSX11 or INTEL 88 particularly welcome.

Applications: Military Systems (including radar, command and control, flight simulation), Industrial Systems (process control, production control, plant monitoring etc), Real Time Operating Systems, Compilers and Language Processors, Networking, Message/Package Switching — and many others.

Salaries: £8K-14K, some even higher. Depends what you've done where you've been.

Look where you can go. Dial either number below. Ask for Beril McLaren. Day or Night she'll answer personally.

Jupiter

Computer Appointments

(REAL TIME MINIS PLACE)

01-474 1175
1111 Tottenham Court Road
London W1P 0LP
or 01-637 9611

OR MAYBE FATE HAS A SWISS ROLE FOR YOU

System "X" — type software people (all levels) are wanted by Interlect, a manufacturer in Switzerland. Permanent, international German speaking position but not essential.

CHALLENGING OPPORTUNITIES FOR ANALYST PROGRAMMERS IN PROJECT MANAGEMENT

HANOVER - WEST GERMANY

DM 60,000

Our client is Preussag AG, one of West Germany's largest group of companies, with a turnover in 1979 of DM 3.2 billion and world-wide business interests ranging from metals through transport and energy to construction.

In the head office, in Hanover, which is an attractive modern city centred on an area rich in forests, lakes and hills they have two IBM 370/158 mainframes and assorted distributed equipment, supported by a very professional EDP team. This needs strengthening by adding one or two Analyst Programmers who after having shown sufficient expertise and with a good command of the German language, should expect to be placed in charge of a project team to handle part of the agreed data processing plan for the diverse companies that constitute Preussag throughout Germany.

They are seeking men or women with at least three to four years' analytical and programming experience in and around the manufacturing areas. The major projects under consideration within this environment cover material planning and inventory control, maintenance and quality control, distribution, disposition of orders and contracts, production planning and shop floor control. You should have experience of the design and implementation of systems within this area; working within allied industries would of course be an added advantage.

In addition you will need current programming experience in COBOL,

PL1 or BASIC; a working knowledge of MUMPS on DEC/PDP would be very useful.

To succeed within the project management area, and to communicate with user personnel a working knowledge of German is essential. However, initially a willingness to learn the language coupled with a basic understanding of grammar and vocabulary would be considered sufficient; help in learning the language will be provided.

A good education, initiative to work on your own and proven performance at meeting project deadlines would be additional factors in your favour.

Our client would prefer to hear from single people, of either sex, or married men able, initially to spend time on their own in Germany, as the projects could involve up to 30 per cent of the time away from the Hanover office in localities both nearby in Northern Germany, but also throughout the rest of the country.

Preussag are offering the right applicants from DM 60,000 per annum plus the normal range of fringe benefits associated with joining a big company, including health and pension plan, and up to 30 days' statutory holiday per year.

The first interviews will be held in London, and to find out more about the job, the company, Hanover or any additional information please call our consultant Len Griffiths in London on 01-828 5584 or 01-828 5701. Alternatively send full details including telephone numbers for us to contact you to

Inter elect

Management Consultants Limited,
11 Catherine Place, London SW1E 6EE. Tel: 01-828 5584/5701

CONSULTANT'S ANALYST'S PROGRAMMERS

**Croydon
London/City**

Salaries to £15k

We have been retained by our client, a major international Services Company to help recruit a number of key people at all levels to fill vacancies at their London offices.

All positions require at least 2 years' practical experience of Systems and Programming work. Candidates should have a prime interest in developing systems and solving business problems.

Flexibility is vital as our client mixes programming, systems work and consultancy, therefore using each person's skills to the full.

Successful candidates are expected to participate fully in the development of the company, and as all promotions are from within, candidates should be positively career conscious.

Excellent salaries and attractive benefits are offered by this fast-growing company which include: Share Purchase Scheme; Free Medical Insurance; Free Life Assurance; Free Pension; Profit-Sharing Scheme; Relocation Assistance, as well as influence in company policies.

CW2/1

CONSULTANT'S ANALYST'S PROGRAMMERS

Dublin

£8,000-£10,000

An established international manufacturing company on the north side of the city requires a competent Programmer who has the ability to advance quickly.

Expertise in RPG II is the main requirement. However, experience of interactive systems, the manufacturing process or database techniques would be helpful for the career that is envisaged for the successful candidate.

Our client will pay a top salary for the right candidate, together with other excellent benefits.

Please contact Joyce Hughes or Gerald Delamere on Dublin (0001) 789577.

CW2/1

Analyst Programmers & PROJECT LEADERS

London Based to £11,000

A London-based European Systems House is seeking Analyst/Programmers and Project Leaders for their diverse operations in the UK, Germany and Holland.

Their business is mainly based on technical projects in the prime industries: Plant Process Control, Designing Minicomputers for the North Sea Oil/Petro Chemical Industry; Laboratory Automation; Mechanical Handling; Medical Systems and H.E.P. equipment are examples of their projects.

Our client is interested in candidates who have real-time mini computer experience and have worked on the following software:

**DEC Data General
Honeywell Intel
Ferranti Philips**

Familiarity with PDP RSX11 is an added advantage, and a knowledge of several high-level languages including ASSEMBLER is necessary for these positions.

Competitive salaries plus generous benefits are offered which includes: Profit Sharing Schemes, Free PPP Medical Insurance, Relocation Assistance, and for the more senior people, a car is also included in this package.

CW2/5

Analyst Programmers & PROJECT LEADERS

Dublin

**Senior Systems Analyst
£10,500-£11,500 + Bonus
Systems Analyst/
Programmer
£9,000-£10,000 + Bonus**

Our client, a market leader with a turnover of just under £100m, requires additional Data Processing personnel for major developments over the next 4-5 years.

The Senior Systems Analyst will report to the S & P Manager and the successful candidate must have at least 3 years' commercial systems experience and be able to develop new systems from scratch.

The successful Systems Analyst/Programmer will be responsible for specifying detailed systems designs from business specifications and be involved in all phases including programming and implementation. At least 3 years' systems design, plus programming in ICL COBOL is required. Progression to full Systems Analyst is assured.

CW2/5

Analyst Programmers & PROJECT LEADERS

Middlesex

An international computer company wishes to recruit a number of staff from all levels to help design, produce and market their electronic Data Processing systems.

Our client's marketing and service organisations cover over 25 countries with emphasis on the USA and Europe. Manufacturing is carried out in Ireland and Germany for the European markets. Research and development plays a major role in the European network.

Systems Analysts with 3 years' commercial systems and design experience are required. Knowledge of COBOL and BASIC is necessary and candidates should be capable of working in a sales environment. You will probably be involved in manufacturing or be employed with a Software House.

Analyst/Programmers and Programmers with 2/3 years' programming and systems experience in BASIC and COBOL are also needed.

If you are interested in working for this highly motivated multinational company, and would like to earn an excellent salary, coupled with the usual generous benefits associated with an organisation of this type, we would like you to contact us.

CW2/7

SYSTEMS DESIGNERS PROJECT LEADERS

North Hertfordshire

We wish to recruit on behalf of an international design and manufacturing company — a market leader in the Process Control Industry.

Our client develops computer systems using their own hardware and software products built around PDP-11 processors. A real opportunity exists for Systems Designers and Project Leaders to develop packages and products.

Candidates should have the ability either to project teams or design software systems.

If you have been working in Multi-Tasking, Data Communication Systems, CPU Buses and peripherals or Automation Systems, we should like to hear from you. Excellent salaries and generous relocation assistance are offered plus the usual benefits associated with a company of such high standing.

CW2/3

LONDON: 26 Lower Grosvenor Place, London SW1
Telephone: 01-834 7105, Telex: 918582

DUBLIN: Canberra House, 24 Lower Leeson Street
Dublin 2
Telephone: (0001) 789577

PROGRAMMER SYSTEMS/ ANALYST

Dublin

**£8,500 +
Mortgage Assistance**

A leading financial institution in Ireland is installing an IBM 4341 in 1981. To complete the development team Programmer/Analysts are required.

Candidates with 5 years in Data Processing are needed, of which at least two should have been using Assembler language, preferably IBM. Additional training in new techniques will be given.

Besides an excellent salary and low cost mortgage, other benefits in this package include a generous pension scheme.

Please contact Joyce Hughes or Gerald Delamere on Dublin (0001) 789577.

CW2/4

S/34 RPG II PROGRAMMER/ ANALYSTS IN CONSULTANCY

Dublin

£7,000-£10,000

Our client is a major Irish accounting and management consultancy practice, employing over 550 people and providing a comprehensive range of professional services to Irish and international companies.

You will be required to work on a variety of business systems being developed on RPG II for outside clients.

If you have at least 18 months' experience of RPG II, our client will be very interested but if you have 5 years' plus, they will want you and will pay more! IBM System 34 experience is of particular interest.

Successful candidates will be offered a position in line with their experience and a future working to high professional standards in a company committed to individual programmes for training and development.

Please contact Joyce Hughes or Gerald Delamere on Dublin (0001) 789577.

CW2/8

SOFTWARE INNOVATION CONSULTANTS ANALYST PROGRAMMERS

Holland Salary up to 90,000 Guilders

A market leader in design and implementation of software systems in data communications wish to expand their Project Team.

Specialising in commercial, industrial and banking systems, a number of positions are available from Analyst Programmers to Senior Consultants. In addition to a degree background, it is important to have had experience of data communications software using mini computers.

Major projects actively engaged upon include real-time (process orientated) systems switching and data transport network.

The Company offers in addition to a substantial salary: 1. full overseas relocation expenses, 2. holiday bonus, 3. resettlement advance, 4. initial accommodation allowance for you and your family, 5. assistance with house purchase, 6. medical attention scheme, etc.

You can also expect to visit our client in Holland prior to final contract.

هذا من اجل

CW2/9

CONSULTANT'S

West London Based

Our client wishes to recruit an experienced Consultant to work in its first-class Bureau Services.

The successful applicant would be working in a small department which holds total responsibility for the company's user support division.

All our client ask from you is wide IBM MVS experience and the ability to deal with a large business system. The chosen candidates would be involved with all the Sales, Support Management and Marketing for this large Services organisation as well as being familiar with a consultancy and managerial role.

The successful candidate will be offered an above-average salary with the following additional benefits: Pension Scheme, BUPA, Sports/Social and Subsidised Meals.

If you would like to have interesting and varied work within this fast-moving company and be guaranteed excellent career prospects, please contact us.

CW2/10

TEL: 01-439 9311

ENGINEER/SCIENTISTCamborne,
Cornwall
£6000-£9000+

The Camborne School of Mines is contractor to the Dept. of Energy and the EEC for a multi-million pound research programme to study the feasibility of commercially extracting energy from the granites of South-West England. The first contract phase will last until July 1983.

The project has reached the stage when computer facilities are required and you would be responsible for the selection, installation and consequent running of the scientific based computer system. Preferably aged in your 20's or 30's you will be an engineer or scientist who has, in later years, developed an interest in computers and their application. It is essential that applicants understand the requirements of scientists and engineers and are used to working in a high technology environment. It is expected that the languages used will be Fortran, Basic and Assembler and various real time operating systems will be utilised. A knowledge of French or German would be an asset.

This vacancy is open to candidates who can be seconded from a relevant industry or who wish employment on the contract.

PER
Professional & Executive Recruitment

Contact:
Mike Trembath on
Plymouth (0752) 680661
or write to:
PER, Mayflower House, Armada
Way, Plymouth

(2927)

Computer Auditor

£9387-£11282 p.a.

The post carries responsibility within the Regional Audit Team for auditing the systems and operations of a Regional Computer Centre which serves all Health Authorities in the South East Thames Region as well as London Postgraduate Hospitals. The Authority employs an ICL 1904S maintenance supported by a team of ICL 2904 installation, training, and on-line interrogation facilities are to be developed.

The ideal candidate, man or woman, will be a qualified Accountant with sound computer and auditing experience gained at senior level, although it might also suit a suitably experienced, graduate level computer professional. Initial training will be given as required and there will be ample opportunities to keep abreast of developing technology.

Salary will be in the range £9,387-£11,282 per annum inclusive of London weighting and other good future career prospects either in the computer or finance fields.

Write for further information and an application form to the Personnel Officer, RHT/MA, Randolph House, 46/48 Wellesley Road, Croydon CR9 3QA. Or telephone 01-480 6577 ext. 58 quoting ref. 103. Closing date for applications 28th January.

South East Thames
Regional Health Authority

(3958)

MERCHANT BANK SUBSIDIARY IN LEYTON

NEW ON-LINE ICL ME.29

Unique opportunity for Computer Person with 2-3 years' ICL experience to run own small Computer Department. Ideal opportunity. Must be able to handle all aspects of day-to-day computer processing including operating, programming and systems work.

Career opportunities in other areas of banking work.

Competitive remuneration package.

Apply in writing to Managing Director.



Close Brothers Limited

16 Great St. (Relais)
London EC3A 6AF

(3959)

SYSTEMS PROGRAMMER

BATH TO £11,000 + BENEFITS

An American owned furniture manufacturing company, based in the West of Bath, is seeking an experienced Systems Programmer. The installation, maintenance and support of a large COBOL program which has a variety of COBOL programs and procedures. The programmer will be responsible for the day-to-day operation of the system and will be required to write and modify programs as required. The successful candidate will have a minimum of 3 years experience in COBOL programming and will be able to work independently. The salary is £11,000 per annum plus benefits. The company is an equal opportunity employer.

01-286 8867
STIRLING EXECUTIVE PERSONNEL
128 WIGMORE STREET, LONDON W1H 9EE

For a New Research Institutein Saudi Arabia
UPM/RU/PL/23 & 24/80:

An Applied Research Center to investigate contemporary problems in Energy, Petroleum, Petrochemical, Geological Resources, Environment, and Organizational Development is being developed by the University of Petroleum and Minerals, Dhahran, Saudi Arabia.

The Research Institute needs - SYSTEMS PROGRAMMER

To perform system generation with the IPL Manager at each update, and when required for other reasons; maintain software: identify software troubles, try to solve them with possible help from Manager or others, inform manufacturer about software troubles, with clear explanation, and perform patches sent by manufacturer; intervene and try to salvage programs at software crashes; maintain software library by integrating newly written or acquired software with the existing package; run diagnostics and thus help with identifying hardware troubles; help users with system operation and programming; write programs and routines clearly defined by users; perform image analysis, as defined by and with users; perform periodic system cleanup (delete, etc.); keep an account of system use for each user and for each subsystem; and perform operator duties when needed (not including corrective maintenance).

The applicant must have at least a B.S. Degree in Computer Science or related field, with minimum of 3 years programming experience, reliable for candidates having an M.S. Degree. Programming experience must include assembly level and systems programming, as well as FORTRAN. Ability to write device drivers and also well defined scientific programs efficiently. Work on H.P. 3000 systems is desirable, but not necessary. Any I.P. work would be a plus.

OPERATOR/TECHNICIAN

To perform system on and off functions; perform routine preventive maintenance (daily, weekly, monthly, etc.); perform requests from users to fetch, mount and dismount tapes,

disks and films; load paper and ink into printers and plotters; operate film reader/writer, according to user supplied parameters; assist users in system operation (simple functions); maintain logbooks on all devices as well as a users logbook; maintain the magnetic tape and film library; keep track of consumables and spare parts; inform supervisor of low stocks; perform first intervention on failures, i.e. inspect, run diagnostic programs and try to identify source and nature of trouble; perform corrective action when possible (technically and contractually); inform supervisor of the trouble and advise, if necessary, to request service within the Institute or from outside (warranty or on call service from manufacturer); and be responsible for keeping a set of backup tapes to be updated every week.

The applicant must have a degree from a technical institute and training on instrumentation and electronic maintenance. Some experience with computers or scientific equipment as operator and/or maintenance technician. Preference for persons with knowledge and work with digital circuits, with electronic electromagnetic manipulation capabilities.

Salaries are competitive and benefits include annual gratuity, housing, and transportation allowance.

The candidates are required to apply within one week of the release of this advertisement, sending detailed typed resume of their educational qualifications and experience, names and addresses of four referees, including their present employer, if possible, and giving information on their present position held, and attaching copies of their degrees and transcripts, last salary drawn certificate from the employer and a passport size photograph. The applications may be sent to:

The Acting Director of Personnel,
Research Institute, University of Petroleum
and Minerals, UPM, Box No. 40, Dhahran,
SAUDI ARABIA.

(3918)

SENIOR SOFTWARE ENGINEER

A new post has been created for a Senior Software Engineer to provide a high quality time-sharing computing service to medical research workers at the Clinical Research Centre. The existing ICL 1903A will shortly be replaced by a DEC 20/50.

The successful applicant will be responsible for acquiring a detailed knowledge of the Tops 20 operating system and utilities at the new computer, for enhancing it and its use documentation. In conjunction with other staff, he/she will develop and implement a policy of software acquisition and maintenance. He/she will also be responsible, in both the divisional and managerial capacities, for the work of the division's junior software engineer and 3 analyst programmers.

Applicants should have a good honours degree in computing science or an equivalent qualification, and at least six years' appropriate experience. The salary will be superannuable, and not less than £5,500.

Application forms and further details may be obtained from Mr. A. Merin, Staffing Officer, quoting Ref. 108/3/4100. Closing date 30.1.81.

(3919)

DEPARTMENT OF MECHANICAL AND PRODUCTION ENGINEERING**RESEARCH ASSISTANT/ DEMONSTRATOR**

(24853-24854-25085)

MICROCOMPUTER CAD/CAM SYSTEMS

A good honours graduate in engineering or computer science is required to introduce limited graphics to a low cost microcomputer and implement a CAD facility which will be linked to a two-axis machine table. The successful candidate will be expected to register for an MPhil/PhD. The appointment will commence on 1 April 1981.

Application form and further particulars from The Assistant Director (Administration), Trent Polytechnic, Burton Street, Nottingham NG1 4BU. Applications to be returned as soon as possible.

TRENT POLYTECHNIC NOTTINGHAM

(3920)

SYSTEMS PROGRAMMING MANAGER

£12,000 +
Cambridge
Applicants should have about 5-7 years' experience in a technical IBM environment with good supervisory skills to lead a team. The company uses an IBM 2381 + DEC 20 computer. Experience of MVS, JES and TSO essential.

SYSTEMS PROGRAMMERS

To £10,500
Croydon
The company has a medium-sized installation using IBM hardware under VM/370 and CDS/VSE with CICS/VS and JCL. If you have at least 2 years' relevant experience for this Croydon job or any other national location, we would like to hear from you.

SYSTEMS ANALYSTS

£7,000-£9,000
Various computer systems and systems analysts with 1-3 months' to 3 years' systems analysis experience.

Locations: BRIGHTON, BIRMINGHAM, CAMBERLEY, BRENTFORD, WATFORD, REDHILL, CROYDON, TUNBRIDGE WELLS, KINGSTON, SLOUGH, ALPERTON, SOUTH LARK, WEST END, BUCKINGHAM and BOREHAMWOOD.

PROGRAMMERS

Junior and Senior Programmers are also required in various areas. Please phone for an Application Form or write, giving FULL details.

AMES PERSONNEL (3783)

Employment Agency Suite 14, Dryden Chambers,
119 Oxford Street, London W1R 1PA Tel: 01 434 1106

NEW YEAR-NEW CAREER?**SENIOR SYSTEMS ANALYSTS (TWO)**

£8,500 PLUS BONUS
Analysts required with experience of IDMS. Strong financial background preferred. Large company benefits including relocation package.

SENIOR PROGRAMMER TO £7,500

International company requires a Programmer with a minimum of 3 years' experience of Cobol. ICL background an advantage.

PROGRAMMER TO £7,000

Programmer with a minimum of 18 months' experience required. A high commercial salary. Excellent company benefits including subsidised mortgage.

For details of these and many other vacancies in the north, please contact Laura or Cheryl on 061-428 3256/8 or Fax on 077618, after 5 p.m. and at weekends or write to:

CV computer staff (3921)

Software Development**Business Communications - Europe**

Rare opportunity to get in at the formative stage of the development of exciting new systems by this world leading multi-national company.

You must have had considerable experience in real time software design and either the implementation of operating systems for real time systems or the design of telephony/data communication modules. Knowledge of stored programme controlled switching systems for telephone or data systems is required.

Senior Systems Designer

Up to £18,000

6-10 years experience after a relevant Master or Bachelor degree. You will control a small team, contribute to the total system design and be involved in the software packages. Ref: 4133/EF/CW.

Systems Designer

Up to £15,000

About 5 years experience after a Bachelor degree or a relevant period after HND. Controlling analysts/programmers you will be responsible for the design of programme modules. Ref: 4134/EF/CW.

Excellent conditions: this could be a career move or a contract (min 3 years). Good relocation terms with housing available in an attractive area on the Continent. Other large company benefits include 25 days holiday; medical aid and sickness scheme; profit sharing. English is the working language.

Please write in confidence giving full personal and career details or telephone 01-499 0342 for initial discussion quoting appropriate reference number to:

Robert Lee
International

24 BERKELEY SQUARE, LONDON W1X 8AR

DATA PROCESSING STAFF**Saudi Arabia****Tax-free salary plus benefits**

The Saudi American Bank is a rapidly expanding organisation in Saudi Arabia; we maintain three data centres in the Kingdom, each with two Perkin-Elmer 3220 computers, with 1 MB of memory each and 356 MB disc drives for on-line storage. Out of each data centre an on-line real-time banking system is run with terminals in remote locations. Now we are looking for a number of experienced data-processing professionals to take two-year contracts, with possible extension to help continue our expansion.

Systems Analysts

You should have at least three years' experience in transaction processing systems for an on-line real-time environment.

Experience of data-base management systems and automation projects for banking applications would also be expected.

You would be based at our head office in Riyadh.

For all positions we offer an attractive tax-free salary, free furnished housing and regular leave with paid air transportation for your whole family.

Please send a full CV and salary history to:
Head of Personnel Recruitment, Saudi American Bank, P.O. Box 833, Riyadh, Saudi Arabia.

SAUDI AMERICAN BANK**WE HAVE MOVED!****PLEASE NOTE NEW ADDRESS**

Classified DIRECT LINE 01-661 0121

01-661 0121

Recruitment



In Informatics

Oil & Seismology

Central London: Salary to £12K

A well-respected Company participating in the development of advanced oil and seismic applications is seeking additional project team members for its central London operations. The Company currently runs a mix of recently installed mainframes with several manufacturers' mini-computers in an on-line and desk-top capacity. Applications Programmers, Software Engineers and Systems Designers should offer commercial experience in a TP monitor, DBMS or distributed processing environment.

More important than specific programming languages used are the applications areas in which candidates have previously worked. Candidates will be considered to have relevant skills if they have programmed or designed in the areas of sales forecasting/budgetary applications, seismic and cartographic data analysis, production and materials control and spare parts/order scheduling. Salaries and fringe benefits are exemplary and will appeal to career orientated professionals. Ref L/2/A

Real-Time Applications

Holland: Salary to £16K

The Dutch division of an internationally renowned Systems and Software House currently requires additional Consultants, Team Leaders, Analysts and Programmers. Suitable applicants will be graduates who have at least one year's real-time programming experience on any mini or micro computer. In-depth knowledge of on-line languages is essential for all positions and of particular interest will

be candidates who have specialist expertise in the field of Communications, Networks, Message Switching or Process Control. As a member of a small project team you will be involved in all stages of the design of a system through to the implementation. These positions will particularly appeal to individuals who have a desire to further their career whilst at the same time enjoying the experience of living in another country. Ref L/2/B

Assembler Programmers

City of London: Salary to £12K

A renowned Financial and Investment Consultancy established for many years within "The Square Mile" is seeking Senior Applications Programmers for its recently upgraded I&M installation. Candidates should preferably offer Assembler Applications programming experience, although COBOL or PL-I Programmers should not be deterred from applying since re-training will be

offered. The Company also uses I&M mini-computers which will eventually operate as part of a distributed processing network. The applications areas involved include Property and Portfolio Management, Debiture and Unit Trust Investment and Stocks and Shares Update. Interviews will be held on the Company's premises in mid-January. Ref L/2/C

Process Control Programmers

South London: Salary to £10K

A well-established Systems House specialising in the supply of Industrial Process Control Systems requires a number of real-time Programmers to join either its Customer Support or Software Development departments. In Assembler is essential and a knowledge of RILS, Coral or Fortran will be an advantage. Applicants who have worked with a manufacturer or have

exposure to Kent, Farnborough or Ferranti based systems will be particularly welcome. As the company has a number of overseas offices, candidates who express an interest in relocation to an E.E.C. country will be offered the opportunity to do so. In such circumstances, a working knowledge of a European language would be useful but not essential. Ref L/2/D

Systems & Prog. Consultants

London: Salary to £16K

Over the last decade, our client, a leading Systems and Software Consultancy, has acquired considerable experience in providing a blue-chip service to various users throughout the UK and Continental Europe. Current personnel requirements are for Systems and Programming Consultants to join specialist project teams working in the London area. Suitable applicants will have de-

signed at least one complete system and will have a minimum of two years' programming experience on any commercial machine. Knowledge of both a high-level and low-level language is a distinct advantage with COBOL and Assembler being the most desirable. It is essential that you demonstrate the ability to liaise with clients and understand their problems. Ref L/2/E

Communications Software

W. Germany: Pkg. to £18K

An established world leader in telecommunications products has urgent requirements for Communications Software Specialists to join existing project teams at its R. & D. Headquarters in Southern Germany. Experience in the design and development of specialised software for PBX or PABX systems is essential. Advantages but candidates with exposure to real-time systems

software are also encouraged to apply. Of particular interest will be those able to demonstrate a knowledge of digital hardware concepts combined with microcomputer programming skills. In addition, to a competitive salary, successful candidates will receive relocation expenses and an attractive benefits package. Ref L/2/F

Customer Support

W. Home Counties: Salary to £10K

Due to the steady expansion of its client base, a leading computer services provider has recently opened a customer support centre to service the Western Home Counties and is now seeking to recruit additional Programmers and Analysts/Programmers to join its existing teams. At least two years' commercial programming experience combined with the ability to liaise with

clients is essential, as is fluency in either Cobol or Basic. Our clients have a strong preference for candidates with exposure to either D.E.C./PDP (range of System's 5/8000 Series equipment). However, applicants with experience on any leading commercially orientated microcomputer should not be deterred from applying. Ref L/2/G

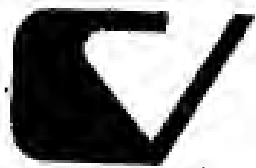
Logistix, 10 Grenville Place London SW7 ARW

01-373 3063



Telex: 28800

(3917)



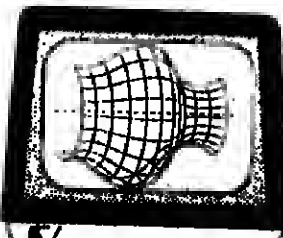
COMPUTERVISION EUROPE

"Computervision Europe, with operations in 10 European countries, is part of the Computervision Corporation, a major U.S. company, which is the world leader in the design and manufacture of Computer Graphics Turn Key Systems - one of the fastest growing high technology industries.

Computervision's Computer Aided Design/Computer Aided Manufacturing (CAD/CAM) systems, and comprehensive support services, are helping customers to increase productivity worldwide.

We are a young, dynamic, highly profitable organisation currently embarked upon a major expansion programme to satisfy market demand."

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Working from home, the successful candidates will be involved with the installation, commissioning and on-going support activities to their respective customer base.

Candidates, with at least 2-3 years' field experience in the computer industry, should have experience of mini-computer systems and associated peripherals, ideally gained with a major manufacturer. Previous experience of CAD systems is not essential as product training will be provided at our Corporate Headquarters in the U.S.A.

Salaries will be as shown above plus profit sharing bonus, and the associated benefits package will include free BUPA and life assurance cover. Assistance will be given with relocation expenses, where appropriate.

We shall be commencing interviews in Regional Centres for these positions from 19th January 1981 so if you are interested please contact Mike Fuller, Customer Support Manager, or Bob Powell, Administration Manager, Computervision Limited, Penn Street Village, Amersham, Bucks. Tel: High Wycombe (0494) 714771, quoting Ref CV/12. Alternatively ring the 24 hour ASL Ansaphone Service on 01-629 1844 for an application form, quoting Ref CV/12.

These appointments are open to men and women.

APPLICATION ENGINEERS up to £10,000

Working from a Regional Office, the successful candidates will provide some training and on-going application support services to both new and existing customers for our CAD/CAM systems.

Candidates should hold a relevant mechanical or electronic engineering qualification and preferably be familiar with the use of mini-computers. Experience of CAD/CAM, NC, PC/ES, and/or Piping/Civil Engineering would be a considerable advantage, although product familiarization will be provided.



Complete the coupon and return to Effective Gravis, National House, 66 Wardour Street, London, W1V 3HP, for your next PERMANENT or CONTRACT job.

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Name (in full)

Address (permanent)

Telephone: Home Office

Type of Transport Date of Birth

Current Position Requested Salary

Position Required (Contract/Permanent)

Salary/Rates

Notice Required/Date Available (date)

Areas Preferred: First Choice

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Experience to date: (Last Position First)

Company Name From To

and Location Mth/Year Mth/Year Duties and experience

NATO MAINTENANCE AND SUPPLY AGENCY

located in LUXEMBOURG, is seeking an
**EXPERIENCED
SYSTEMS
ANALYST**

with at least 2 years' programming experience and 1 year's Systems Analysts in the area of military or industrial systems development. To join an existing development team using IBM 4341, System 34 and peripheral equipment.

Candidates should have a university degree and preferably an additional qualification (e.g. Business Studies, Accountancy, Information Processing, etc.).

A working knowledge of French and English is mandatory.

Please write providing full personal and career details, not less than 10 JANUARY, 1981, to:
The Chief Personnel Division
NATO SUPPLY CENTRE
B.P. 73
L-2323 CAPPELLIN

DATA PROCESSING OFFICER

The post of Data Processing Officer will be based in the United Kingdom. The successful candidate will have a minimum of 5 years' experience in the field of data processing, including the use of computers, systems analysis and programming. The post holder will be responsible for the day-to-day operation of the data processing system, ensuring that it is running efficiently and that all data is processed accurately and in a timely manner. The post holder will also be responsible for the training and supervision of staff, and for the development and improvement of the data processing system. The post holder will be required to have a good knowledge of the following: data processing systems, computer systems, systems analysis, programming, and data management. The post holder will be required to have a good knowledge of the following: data processing systems, computer systems, systems analysis, programming, and data management. The post holder will be required to have a good knowledge of the following: data processing systems, computer systems, systems analysis, programming, and data management.

U-C-A 'HAPPY NEW JOB TO ALL' Analyst Programmers

Central London
A large international company in Central London requires Analyst Programmers with a minimum of two years' IBM COBOL/CICS experience. A Hewlett Packard background will also be considered for their on-line major application enhancement. This is an excellent firm with a first-rate career structure and perks that include flexitime, free lunches, non CPS and 4 weeks' holidays.

Salesmen Salesmen Salesmen
London & Home Counties
An established market leader wishes to expand his penetration of the mini/micro market by establishing Senior Salesmen to take charge of existing accounts whilst obtaining new business. A real chance to match your efforts with reward and managerial promotion after a reasonable period is well on the cards.

**We also have 40 other
Analyst/Programmer vacancies**

Contract Programmer Analysts
To £450 p.w.
IBM Banking Experienced Analyst, Surrey, 3 months.
IBM OS Cobol Jackson SP, Middlesex, 3 months.
IBM 4341 Cobol, Hants, 3 months.
IBM 4341 DMS 1100, Sussex, 3 months.
IBM 4341 CICS DOS VS Cobol, London, 6 months.
IBM 4341 CICS PL1/Holland, 1 year.
IBM 4341 DOS VS Assembler CICS, France, 6 months.
PDP Assembler, Germany, 1 year.

PHONE IRENE FOR DETAILS
Recruitment Consultants
Universal Computer Associates Limited
Data Express House
Prospect Place, London W4 3BR
01-895 3883 (01-895 8138 Evenings)

Programming Opportunities Eastbourne, Sussex

Armour Pharmaceutical Company Limited, a U.K. subsidiary of the Revlon Health Care Group manufactures a wide range of leading pharmaceutical products at Eastbourne, Sussex.
We are currently undertaking a major expansion programme and will be taking delivery of a new IBM 4331 Computer early in 1981.
In order to achieve our project plans we are seeking to appoint the following staff immediately.

Systems Software Programmer
Reporting directly to the Manager, EOP, the Systems Software Programmer will be responsible for the generation and installation of OOS/VSE and installation later in 1981 of VSAM and CICS.
The successful applicant will have spent at least one year in IBM Systems Programming and must be prepared to accept responsibility. A keen and enthusiastic approach is required combined with the essential desire to get the job done.

Analyst/Programmer
Also reporting to the Manager, EOP, the Analyst/Programmer will be required to take a leading role in the analysis and development of new projects. We plan to convert our existing systems from the present ICL 2903 Computer and to have the 4331 fully operational by autumn 1981.
Applicants should have a working knowledge of VSAM and/or CICS to ensure efficient implementation of data entry and on-line programs and to give guidance on the correct approach for future on-line development.
Knowledge of COBOL is essential and experience of RPG or Assembler would be desirable.

Applications Programmer
The Applications Programmer will be required initially to assist in the successful transition of Systems to the new 4331 and then to provide support in the development of new projects.
We are looking for applicants with a minimum of 18 months' experience in COBOL for an IBM Computer and knowledge of VSAM and/or CICS would be an advantage.
We offer a progressive salary structure, Pension Plan, Life Assurance, 21 days annual holidays, Sick Leave Scheme and other benefits associated with a successful Company which is part of a major international organisation. Relocation assistance to this attractive part of the country will be given where appropriate.
Please write giving full career details or telephone Eastbourne 21422 for an application form.

The Personnel Department, Armour Pharmaceutical Company Limited,
Srempton Road, Hampden Park, EASTBOURNE, East Sussex BN22 9AG.

A FUTURE IN SCOTLAND

On behalf of our West of Scotland clients we are looking for ambitious professionals to take up important posts in their D.P. department. A multi-national concern with expanding interests, our clients have a major share of the UK market and increasing export figures. A highly profitable and therefore highly stable concern, their workforce is unaffected by the current economic recession.

The IBM installation of their batch and on-line processing with future plans for new hardware already underway. Because of the successful nature of the company there are excellent opportunities for career progress and individual recognition.
PROGRAMMER circa £7,000
Candidates should have a minimum of one year's programming experience in RPG and an expert to be greatly involved in development programming.
SENIOR ANALYST/PROGRAMMER circa £8,000
Candidates should have an RPG programming background and experience of systems design. Responsibility for software will be given to the right candidate, from whom on-line experience would also be an advantage.

PROJECT LEADER
circa £9,000 + car allowances
The successful candidate will be involved in high level systems and database design and is likely to travel to installations throughout Europe. Applicants should be capable of working quickly and efficiently and would preferably have a wide experience, perhaps with a major company, and a knowledge of fiscal reporting. On-line experience would be a great advantage as would past involvement with RPG. The company, situated close to one of Scotland's many beautiful areas, offers normal large-company benefits, a generous relocation package and an outstanding opportunity for both security and job progression.
Please write to the address shown below, quoting reference 605 and listing on a separate sheet those companies to which your reply should not be forwarded.

Harrison Cowley Recruitment
1a Hill Street, Edinburgh, EH2 3JR. Telephone 031-225 8676.

CONTRACTS

SAUDI ARABIA
CONSULTANTS, SYSTEMS ANALYSTS AND PROGRAMMERS
(SCIENTIFIC & COMMERCIAL)
8 to 12 month contracts
Experience should include at least two of the following requirements:
COBOL IMS IBM DATA DICTIONARY
PL1 TSO IBM UTILITIES
FORTRAN ADF MARK IV
OS JCL SP/USER DOCUMENTATION

LONDON
IBM COBOL PROGRAMMER - RAMIS experience essential. Experience of ROSCOE, JCL, IMS and MARK IV an advantage.
RPG II PROGRAMMERS - for IBM System 3, C.C.P. experience required.

MIDDLESEX
COBOL PROGRAMMER - J.S.P. experience required.
Please reply A.S.A.P. to:
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101a Clapham High Street, London SW4 7TS

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Sales & Marketing Recruiters Ltd
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**SALES
EXECUTIVES**

Just in case you think we are merely the industry's leading supplier of career guidance for salesmen (to say nothing of sales training and market research), we are currently recruiting candidates for over 100 selling jobs within more than 30 computer companies.

If you are seeking a career rather than just a selling job, contact Alasdair Scott or Alan Williams - we have the experience to understand your needs.

Tel: 01-734 9776

**Systems
Management**

Trusthouse Forte, the market leader in hotel, catering and leisure activities, is expanding its systems and D.P. function to meet the challenge of the future, and has two senior vacancies:

Group Systems Manager - reporting to the Director of Group Systems, you will advise him and Divisional line management on D.P. systems and equipment throughout the Group, and will also be responsible for the overall control of the implementation of specific D.P. projects.
You should have extensive data processing experience and have worked with many suppliers and clients. You will have the tenacity, ability and personal motivation necessary to achieve excellent results, together with a high degree of professionalism and integrity.

Senior Systems Analyst - Hotels - Reporting to the Divisional D.P. Manager, you will be part of a small team, responsible for the selection, implementation and support of computer systems in our Hotels Company. You will have practical experience of developing systems, together with an in-depth knowledge of a wide range of hardware, particularly minicomputers. You will probably be in your late twenties and have the ability to communicate effectively with staff and management at all levels.

These are senior appointments which carry attractive salary and benefits packages, together with exciting career prospects. Office locations in Central London.

Please apply, stating which job you are interested in, and giving full details of qualifications, career history, age and current salary to: C. G. Forbes, Group Personnel Manager, Trusthouse Forte Limited, 7 Henley Square, London, W1R 0PS.

TRUSTHOUSE FORTE GROUP

**RECRUITMENT
KINGSTON £££**

We are an expanding Recruitment Consultancy currently operating from 2 UK centres and are only seeking ambitious persons interested in recruitment as a consultant for an expanding DP market.

You will work initially with a senior consultant in our Kingston office and receive the full training that only a professional organisation can offer. (The test is up to you!) You will assist in the recruitment of candidates who will provide the minimum income he needs without clawing it back if things don't work out.

If things don't work out? It is easy for an employer to assume that the only reason a new salesman fails is because of his own ineptitude.

This is far from the case. In my experience the main reason why many salesmen fail to earn an income in excess of the "hobby" allowance against commission is due to a total misapprehension on the part of management as to how long the guarantee period should be. The normal 10 mth.

Telephone Alan Sanders for an interview today!

**RECRUITMENT
KINGSTON £££**

01-549 6441 AB EXECUTIVE

THE SALES BIT

The six-month 'guarantee' is a deception

IN the last issue I dealt with advances against potential commission earnings for sales recruits and the implications of making such payments returnable. I also touched on the relationship between this situation and the responsibility of field sales management to monitor the performance of new recruits.

The withdrawal or non-existence of a scheme for providing an initial minimum income guarantee can lead to a variety of problems involving both existing and potential sales personnel. For those inside the company who are already beyond the normal guarantee period, the ramifications of withdrawing the "guarantee" system are minimal. There may perhaps be some negative debate about why the company thought it necessary to have it removed - cash flow, declining sales, automatic impulse.

For those currently within the guarantee period the reactions are likely to be the same, unless the scheme is withdrawn overnight as opposed to being phased out. The latter route can lead to a variety of problems, with breach-of-contract at the least of the worries. The inflation of "instant insecurity" must have a variety of demotivating effects. The prospect of possibly having to pay money back to one's employer at a given point in time can soon become a focal point that overrides all activities and considerations other than finding a more secure job and keeping up the mortgage payments.

Confidence
The biggest problem occurs when it comes to recruiting new salespeople. It's all very well for a senior executive to say that the kind of salesmen he wishes to recruit are aggressively enthusiastic with absolute confidence in their ability to succeed without the crutch of a non-returnable guarantee. A salesman may be totally convinced of his ability to sell, but he cannot have the same conviction about a company and product he does not know. On the outside-looking-in, one computer product looks much the same as another. He sees a non-returnable advance against commission as a token of a company's confidence in itself and its products. How can he apply himself totally to the process of getting the new job "off the ground" when the real prospect of being unable to meet his financial obligations is waiting six months down the line?

Why should he, when there are plenty of other good companies around ostensibly with equally good products and prospects which will provide the minimum income he needs without clawing it back if things don't work out? It is easy for an employer to assume that the only reason a new salesman fails is because of his own ineptitude.

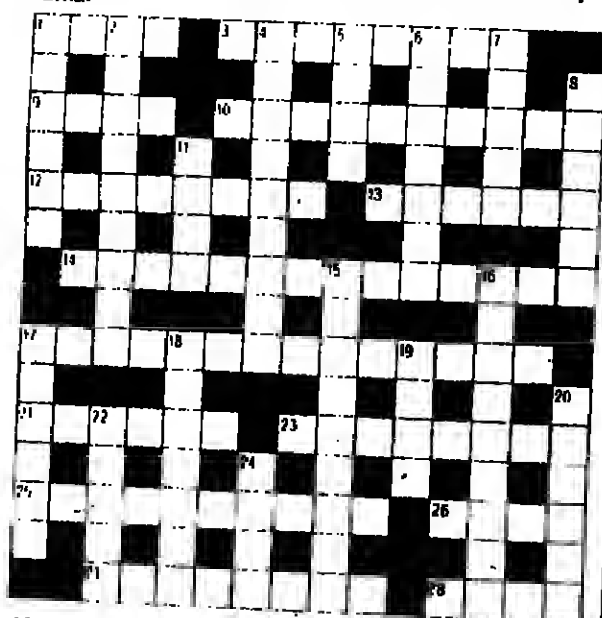
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Puzzle Answer
AT the moment when the train entered the tunnel, the speed was 100 mph. The length of the tunnel was 100 miles. The train was 100 miles long. The only way it could have been 100 miles long is if the train was 100 miles long.

CW Prize Crossword 12

Compiled by Alec Robins

A prize of £10 will be awarded for the first correct entry opened. The second and third solutions opened will receive £5 each. Entries to Crossword Competition, Computer Weekly, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS, by first post Friday, January 16. Please use a ballpoint pen to complete the crossword and include a telephone number where you can be reached during the day-time.



Name..... (Miss, Mrs, Ms, Mr)

Address.....

Telephone.....

I accept the rules and conditions of the Computer Weekly Crossword Competition.

Signed..... Date.....

ACROSS

1. Caught the Huns' leader, a barbarian (4)
3. A fall from a hillside's also observed in a bad spill (8)
9. Crazy cricketers (4)
10. Branch of learning that writers study, and possibly rue it later (10)
12. Fall to notice what superintendents do (6)
13. Look for a bird (6)
14. The splendidly elite sailor often has home around the East (4,2,3,5)
17. Live very thriftily, as bleating poor fiddlers do? (3,3,6)
21. Silver found in the pool is scarce (6)
23. A rustic, perhaps, badly interred in a crude grave (8)
25. Players I confined within bounds and told off (10)
26. Half of us, with expert about, paint comely (4)
27. Prime Minister is taken back in case that's most ordinary (8)
28. The boss has to mediate endlessly (4)

DOWN

1. Animal trap catches Bob, unfortunately (6)
2. Brine that ruined a parson's corn-store (5,4)
4. One swell tucking into a cake for a lark (1,3,2,3)
5. A fight expected with Liberals, initially (4)
6. Have a smoke concealed in shelter and foliage (7)
7. Type of boat kept in a lake for the sovereign (5)
8. Want former coppers on the land (6)
11. The fool gets left in bed (4)
15. The man's beginning to sprint round one street in hurry (9)
16. Rising up in the course of ruling is disastrous (9)
17. Inverted cloth bundle for cleaning, one that's used in older-making (6)
18. The girl is loved in an Order for bravery (7)
19. Annoy king and upper priest (4)
20. Quietly dressed, getting examined searching (6)
22. Stupid fellows, making girls go topside (5)
24. Cry about everything (4)

C.A.C.I.Analyst/Programmers
London £6,000-£10,000

CACI has established a leading position in a rapidly growing application area: the creation and supply of specialised marketing data. Our customers now include many of the country's largest companies.

We need analyst programmers with at least two years' experience to work on our DEC VAX 11/780 delivering projects and developing FORTRAN systems for—

- Interactive data retrieval
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If you are a graduate with the initiative to work with little supervision and the potential to become a project leader, CACI can offer you:

- Excellent salary
- Bonus scheme
- Rapid career development
- Stimulating working environment
- Interesting and varied applications

CACI is a highly successful international software company. We grow 50% each year and currently employ over 1,000 people in Europe and America.

Apply: Market Analysis Group, CACI, 280 High Holborn, London, WC1V 7HZ. 01-495 2245.

(3942)

RE-ADVERTISEMENT**Microelectronics Education Programme**

Applications are invited for a post on the small management team being established to run the Government's Microelectronics Education Programme, which will consist of a range of coordinated projects commissioned through national bodies, local organisations and individual schools and colleges. The appointment will be for a fixed term, ending on 31 March 1984. Secondment from an existing post will be possible. The Programme Team operates from offices in Newcastle upon Tyne.

MANAGER (TECHNOLOGY)

To have particular responsibility for projects dealing with—

- the teaching of electronics, control technology and associated topics
- the development of teaching materials dealing with the technology of microelectronics

The Team will also look to the Manager (Technology) for technical advice on microelectronics. A requirement of the post will be to visit projects throughout England, Wales and Northern Ireland.

Applicants will need both educational and technical experience. Salary on a scale from £7360 to £9088 (Administrative Officer).

Applicants may ask for assistance with removal expenses. Closing date for application: 28 January 1981.

Further details of the post are available from The Office Manager, Council for Educational Technology, 3 Devonshire Street, London W1N 2BA.

(1945)

Programming Professionals

up to £12,100 Harlow

As a result of continuing expansion of our activities and internal promotion, we need first class professionals to work in project teams developing and maintaining group-wide commercial applications on Univac 1100, ICL 2900 and DEC computers. Both interactive and database systems are being developed, with applications including financial, accounting, marketing, shipping and inventory control.

You should have about 3 to 5 years' COBOL experience and although a degree is not essential, you should be of graduate calibre to match the exacting requirements of the posts. Experience in one or all of the machines we use and in FILETAB, TFS or Jackson structured programming would be an advantage.

Salaries are in the range of approximately £7,300 to £10,700 and £8,200 to £12,100 depending on experience. Career development opportunities are first class. Benefits include generous relocation assistance, if appropriate, to this pleasant part of West Essex, a non-contributory pension scheme, subsidised lunches and excellent sports and social facilities.

Please write or phone for an application form by January 16th to: Roy Lacky-Thompson, Personnel Co-ordinator, The British Petroleum Company Limited, BP House, Third Avenue, Harlow, Essex CM19 5AG. Tel: Harlow (0279) 28851, ext. 2621.

**SYSTEMS ANALYST**

Good systems analysts experience required, this having been gained in a commercial environment. Contract to start end of January for a minimum of 6 months. Please contact DAPHNE JONES.

FORCE 0
Computer Services
8 Mint Walk, Croydon
01-680 3761

BOX NOS.

Box number, replies should be addressed to
Box No.
c/o Computer Weekly
c/o Computer House
Stanford Street
London E81 5LU

BANKING DP EXPERIENCE?

Established Software House specialising in the provision of software and consultancy support to Banks and other financial institutions, both in the U.K. and abroad, would like to hear from freelance analysts/programmers with a suitable background with a view to undertaking short, medium or long-term assignments.

Experience should include at least one of the following machines and languages:

IBM System/34, NCR B250, Burroughs B80/B800, DEC PDP/11, COBOL, RPG II, BASIC.

Please send c.v. and other relevant details to Box No. 1120.

(194)

MYRIAD**SYSTEMS ANALYSTS**

WEST LONDON

TO £10K + BENEFITS

IBM 4300
NEW SYSTEMS DEVELOPMENT

Only very occasionally does an opportunity arise to join a data processing department which is moving into new areas of its company's business to provide a professional and effective information service.

The successful and expanding business of our client offers such an opportunity for an ambitious commercially-minded analyst to play a key part in the development of new systems based upon an IBM 4300 mainframe.

The computer applications involved are stimulating in both the business and technical sense and therefore applicants will find that the potential for their own development is fully within their control.

The importance that the company places upon this appointment is reflected in the attractive commencing salary which will be offered to the successful candidate.

Ref: NW1/0801

SENIOR ANALYSTS

MOVE TO FIVE FIGURES

SOUTH HERTS

£10,000 +

Our client offers:

- ★ New development
- ★ Project responsibility
- ★ Professional business environment
- ★ IBM Hardware + TP & Database
- ★ Planned career progression
- ★ Regular education & training

You need:

- ★ Innovation, energy & resolution
- ★ Previous project success
- ★ Leadership qualities
- ★ Programming background
- ★ Good liaison qualities
- ★ Drive and ambition

The company is a highly successful organisation and offers a full range of employee benefits and job security.

Ref: NI/0801

IBM + MININETWORK

A large international company is expanding its data processing operation by adding a network of mini-computers to its powerful IBM mainframe. These small machines will support DATABASE applications and all programming is in COBOL.

NORTH SURREY**PROGRAMMERS**

c. £7,000

To specify and develop COBOL programs applicants will have a good academic record with a minimum of twelve months commercial experience, preferably gained in an IBM environment.

ANALYST/PROGRAMMERS

£8-£9,500

These positions require systems analysis/design knowledge and will have the extra responsibility for project implementation and the supervision of programming staff.

The Company offers an excellent salary and benefits package with a view to long-term development and is very accessible by road and rail.

Ref: SI/0801

**PROJECT MANAGERS
ANALYST/PROGRAMMERS
TEAM LEADERS**

C. LONDON

£8,000-£12,000

The retail industry is becoming increasingly sophisticated and is still growing healthily. Our Client, a frontrunner in this industry and a household name has a vast number of outlets with a wide geographic spread. The growing size and complexity of their retail operations has led them to embark upon a major project to extend their interactive communications system.

This ambitious project has created the need for additional Analyst/Programmers, Project Managers and Team Leaders with a commercial systems background. Analyst/Programmers should possess a minimum of TWO YEARS' COBOL experience.

A substantial benefits package together with competitive salaries combine to make this an attractive opportunity to secure your future.

Ref: CI/0801

**NEW IBM
INSTALLATION**ANALYSTS AND PROGRAMMERS
Middlesex To £10,000

Additional Analysts and Programmers are required now to enhance the Systems and Programming Team of a major organisation able to offer a secure future and positive career development.

A range of interesting and varied systems are scheduled for development and implementation on a new IBM 4331 to be delivered in 1981.

PROGRAMMERS should have at least two years' experience programming in COBOL or RPG II on IBM or compatible hardware.

ANALYSTS should possess a programming background and over two years' analysis experience.

An outstanding benefits package combined with the opportunity to gain formal training and move to IBM hardware make this a challenging and valuable career move.

Ref: C2/0801

**ASSEMBLER IN
ESSEX**

c. £8,500

This is an ideal opportunity for IBM ASSEMBLER Programmers to make that important next move to establish themselves on an exciting career path.

Our client, a leading company in their field, is seeking additional programming staff to contribute to an extensive data processing development programme over the next five years. Full use will be made of Database and Real-time techniques.

The Company can offer you pleasant working conditions, up-to-date IBM hardware, an excellent salary and benefits, and the opportunity for positive progression to senior positions within the company.

If you would like to find out more about the excellent opportunities open to you, call Myriad now and discuss your future.

Ref: E1/0801

(1946)

MYRIAD APPOINTMENTS LIMITED

30 Fleet Street London EC4Y 1AA Telephone 01-253 0981 24 hours

GUIDE TO RECRUITMENT CONSULTANTS IN THE U.K.

LONDON & H. COUNTIES (LH) MIDLANDS (M) NORTH (N) SCOTLAND (S) OVERSEAS (O)

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1500 Management Consultants Ltd
1500 Management Consultants Ltd

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SURE WE HAVE YOUR NAME
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For Northern Management Services Ltd
Recruitment Consulting Division
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1500 Management Consultants Ltd
1500 Management Consultants Ltd

FOR CLIENTS AND APPLICANTS IN UK AND OVERSEAS
Alex Daily
1500 Management Consultants Ltd
1500 Management Consultants Ltd
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